DOCUMENT RESUME

ED 102 409 95 CE 003 141

TITLE	Textile Design: A Suggested Program Guide. Fashion Industry Series No. 3.
INSTITUTION	Fashion Inst. of Tech., New York, N.Y.
SPONS AGENCY	Bureau of Adult, Vocational, and Technical Education (DHEW/OE), Washington, D.C.
PUB DATE	73
NOTE	121p.; For other documents in Fashion Industry Series, see CE 003 139-142 and CE 003 621
AVAILABLE FROM	Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402
EDRS PRICE	MF-$0.76 HC-$5.70 PLUS POSTAGE
DESCRIPTORS	Adult Vocational Education; Behavioral Objectives; Career Ladders; *Curriculum Guides; *Design; Design Crafts; Educational Equipment; Employment Opportunities; Instructional Materials; *Job Training; Needle Trades; *Occupational Home Economics; Occupational Information; Program Development; Resource Guides; Resource Units; Secondary Education; Skill Development; *Textiles Instruction
IDENTIFIERS	*Fashion Industry

ABSTRACT

The textile design guide is the third of a series of five interrelated program resource guides encompassing the various dimensions of the fashion industry. The job-preparatory guide is conceived to provide youth and adults with intensive preparation for initial entry employment and also with career advancement opportunities within specific categories of jobs within the textile industry. The guide provides an overview of the textile design field, occupational opportunities, and competencies required of workers. It contains outlines of areas of instruction which include objectives to be achieved, teaching content, and suggestions for learning experiences, evaluation, teaching resources, and instructional supplies. These areas include fundamental background instruction, basic skill development instruction, and career advancement instruction, ranging from basic design and textile courses to advanced job skills in print design, screen printing, woven design, and weft knit design. (Author/MW)

ED102409

FASHION INDUSTRY SERIES NO. 3

Textile Design

a suggested program guide

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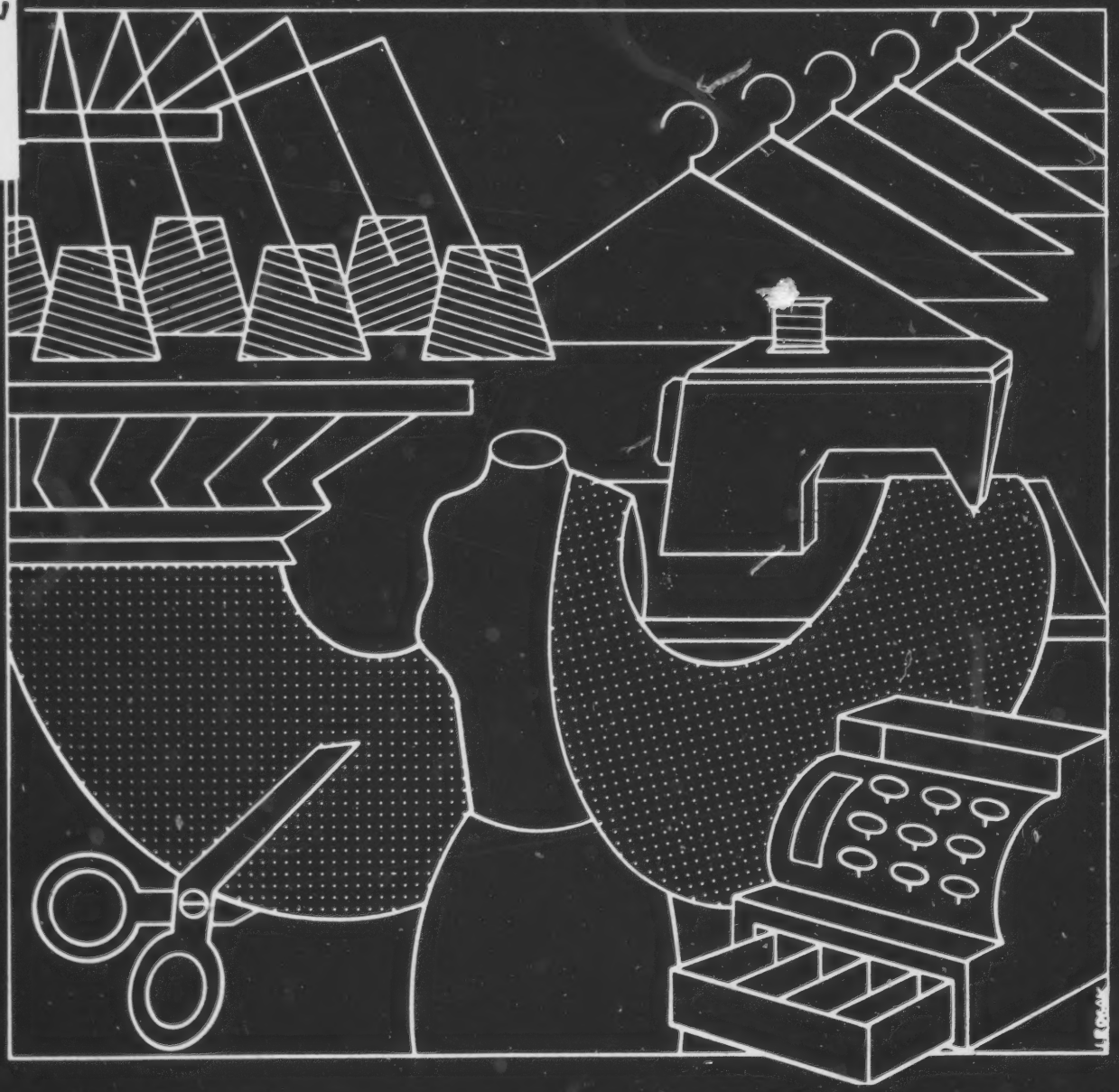

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Developed pursuant to a grant
from the
U.S. Office of Education
to
The Fashion Institute of Technology
New York, New York
1973

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FOREWORD

The *Textile Design* guide is one of a series of interrelated program resource guides encompassing the various dimensions of the Fashion Industry. The purpose of the series is to provide school administrators and teachers with a source of information which can be used to establish, expand, or evaluate instructional programs related to the broad field of fashion.

The Fashion Industry Program Series includes five separate guides. *Career Exploration in the Fashion Industry* – Series No. 1 presents an introduction to the different segments of the fashion field and a suggested career exploration program. *Apparel Design and Production* – Series No. 2, *Textile Design* – Series No. 3, *Fashion Merchandising* – Series No. 4, and *Dry Cleaning and Laundering* – Series No. 5, are suggested job-preparatory (skill development) program guides. These job-preparatory guides are conceived to provide youth and adults with intensive preparation for initial entry employment and career advancement opportunities within specific categories of jobs in the fashion industry.

In developing the job-preparatory guides, consideration was given to the structuring of objectives, content, and learning experiences in terms of the varying competencies considered essential for different levels of employment responsibility, thereby facilitating the adoption of performance-based instruction within a variety of institutional settings. The outcomes of such instruction are identified with immediate employment or continuing higher education.

This *Textile Design* guide provides an overview of the textile design field, occupational opportunities, and competencies required of workers. It contains outlines of areas of instruction which include objectives to be achieved, teaching content and suggestions for learning experience, evaluation, teaching resources, and instructional supplies. Suggested equipment and approximate costs are included as well as a bibliography and a list of representative trade associations. Other program considerations and services judged to be important to this job-preparatory program are also presented.

All of the guides were developed by faculty specialists of the Fashion Institute of Technology pursuant to a grant from the U.S. Office of Education to the Institute. This guide was prepared by Miriam Russo, Associate Professor and Chairman of the Textile Design department. Miriam Fredenthal, Assistant Professor of Textile Design prepared the areas of instruction in Woven Design; W. Parrish-Martin, Assistant Professor of Textile Design contributed the Screen Printing Design instructional areas; and George Gati, Adjunct Instructor of Textile Design developed the Knit Design instructional areas. Lorraine Har, Assistant Chairman and Professor of Textile Design coordinated the suggested equipment and supplies.

The development of the guides was under the direction of William Berndt, Project Officer, and Mary Lee Hurt and Edwin L. Nelson, Education Program Specialists in the U.S. Office of Education.

Many useful suggestions were received from industry and educational consultants, and from administrators and teachers of existing programs. Although all suggestions could not be incorporated, each was carefully considered in terms of the publication's intended use. In view of this, it should not be inferred that the program suggestions are completely endorsed by any one institution, agency, or person.

The program suggestions contained in this guide should be viewed as resource information which can be modified and adapted by administrators and teachers to meet local, State, and regional needs.

Jeannette Jarnow
Edwin Goodman Professor, Fashion Institute of Technology;
Project Director, Program Guides for the Fashion Industry.

ACKNOWLEDGMENTS

Grateful acknowledgment is due many teachers, school administrators, publishing colleagues, and individuals in the textile industry for their aid, counsel, and cooperation in the preparation of this publication.

In particular, the project team of the Fashion Institute of Technology wishes to recognize the special guidance provided by the following individuals:

Robert Gentile, Stylist, Fisher and Gentile Ltd., New York, New York.

Eta Herbst, Head of Fabrics Development Department, Aileen Inc., New York, New York.

Irving Kaplow, Vice-President, Reeves Bros. Inc., New York, N.Y.; Chairman, Education Committee of Textile Distributors' Association.

Ed Newman, Director of Creative Services, Dan River Sales, New York, New York.

Leslie Tillett, Consultant on Design, New York, New York.

Susan Wasack, Stylist, Hess Goldsmith Division, Burlington Industries Inc., New York, New York.

Nell Znamierowski, Coordinator of Textile Design Program, Brooklyn Museum Art School, Brooklyn, N.Y.; Free-Lance Designer and Lecturer, New York, New York.

The information and cooperation provided by administrators and staff of the following associations and institutions during the development of this publication are also acknowledged with appreciation:

American Textile Manufacturers' Institute, Charlotte, North Carolina.

Board of Cooperative Educational Services, Westbury, New York.

High School of Fashion Industries, New York, New York.

Jane Addams High School, Cleveland, Ohio.

Textile Distributors' Association Inc., New York, New York.

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THE IMPORTANCE OF THE FASHION INDUSTRY

Fashion is as old as recorded history and as new as tomorrow. It manifests itself not only in what people wear but in what they eat, the way they talk, what they do, how they live and the things they use.

THE IMPACT OF FASHION

Fashion can be defined as all of the prevailing styles followed by substantial groups of people at a given time in a given place. Fashion touches many facets of human living and, in turn, the changing conditions of the environment in which that living takes place bring about changes in fashion. The intensity with which changes in fashion are followed by people everywhere on all levels of society is evidence of its impact on human activities and its significance as a social phenomenon.

The phenomenon of fashion has been studied, analyzed, and explained in many different terms. Economists view it as an element of artificial obsolescence that impels people to replace commodities which still retain their original usefulness even though the new may not greatly differ from the old. To sociologists it represents a manifestation of social interraction and an element of status seeking; psychologists find indications of sex impulses in patterns of dress. Historians see fashions as a reflection and documentation of the ideals, tastes, and values of their times just as are paintings, sculpture and other art forms.

The influence of fashion is felt not only throughout the social world but in all categories of economic activities. It is most clearly demonstrated however in a multi-billion dollar industry complex, commonly known as the "Fashion Industry", which is dedicated to the design, production, and distribution of apparel and accessories for men, women and children. Because clothing is considered to be the oldest and purest form of fashion expression, this industry embodies more aspects of fashion than any other single rallying point.

Fifty years ago "fashion" was directed, ordained, cultivated and handled by the few, in small shop operations. Today the fashion industry is, on the one hand, the exclusive air of an elegant specialty store presenting a collection of high-priced originals, and on the other hand, it is the giant factories that dispatch "blue jeans" in endless dozens to cities and prairie towns across America.

A business that began as an enterprise of small shops now caters to and employs millions of people, offers a multitudinous array of products, utilizes a diversity of talents and ranks among the largest industries in our economy.

SCOPE OF THE FASHION INDUSTRY

The fashion industry is not a clearly defined entity. It is a complex of many different industries, not all of which appear to have anything of fashion among their products.

Plainly recognizable as part of the fashion business are those industries devoted to the making of apparel and accessories for men, women and children. When one moves back to an earlier stage of production, to the fabrics, leathers, and plastics from which the finished products are made, the line between what is and what is not the fashion business becomes even harder to draw. Some textile mills that produce apparel fabrics also produce bed sheets, carpets, or industrial fabrics. Some chemical companies that produce fibers which eventually are spun, woven and cut to make garments are producers also of explosives, fertilizers, and photographic film. Some producers and processors in fields normally remote from fashion find themselves temporarily with one foot in the fashion business when prevailing styles demand such items as industrial zippers, chain belts, paper dresses, or whatever the case may be. A season or two later, they may be as far removed from it as ever, but for the time being, they too are part of the business of fashion.

The fashion business includes the stores that sell and service apparel and accessories, and the mail-order catalogues from which many consumer purchases are made. It includes businesses that neither produce nor sell merchandise, but render advice, assistance or information to those that do. In this last category are consumer publications that disseminate news of fashion, ranging from the women's page of the daily newspaper to magazines devoted primarily to fashion news such as *Vogue, Harper's Bazaar* or *Gentlemen's Quarterly*. Also

included in this category are trade periodicals which carry news of fashion and information on production and distribution techniques to retailers, apparel manufacturers, and textile mills. It includes also publicists and advertising specialists, fashion consultants, and buying offices that represent retail stores in the vast wholesale centers.

All these and more are part of the business – farms and mills and factories, union labor and white-collar workers, business tycoons and creative artists. All play their parts in the business of fashion.

ECONOMIC IMPORTANCE*

The economic activities involved in the design, production, merchandising and maintenance of textiles, apparel and accessories are a sizeable force in our nation. Whatever yardstick one uses as a measurement, their importance becomes clear.

In terms of money that Americans spent in 1972, clothing, accessories, shoes, and clothing care services accounted for 62 billion dollars, an amount which constituted almost 10% of total consumer expenditures. In terms of factory output, the industry also ranks high. Textile output for 1972 reached 28 billion dollars and factory shipments of men's, women's and children's apparel exceeded 26 billion dollars.

Millions of people are employed in producing textiles and apparel, in staffing the retail stores that make this merchandise available to the consumer, and in the retail or industrial establishments that specialize in clothing services. Of the 20 million people employed in U.S. manufacturing industries in 1972, practically one in every eight was employed either in the industry divisions that produce apparel for men, women, and children or that produce the materials from which clothing is made. The apparel segment which alone employs almost 1.4 million people is the 6th largest employer of people in the manufacturing sector of the economy and, for example, employs more people than the entire printing and publishing field or the chemical and drug industry. Textile firms employ another million workers. In addition, retail outlets that play a significant part in the distribution of clothing employed the services of more than 1/4 of the 11.7 million men and women engaged in retail occupations in 1972 and of this number it is estimated that 50% are engaged in activities directly concerned with the merchandising of apparel and textile products. Drycleaning and laundering service establishments employed an additional 1/2 million.

The industry is also important to all parts of the country rather than just a small geographic area. Although the heaviest concentration of textile manufacturing facilities is in the South and New England, some phase of textile activity is carried on in nearly every state of the Union. Apparel production plants can also be found in every state and are increasingly being located in small towns where, in many cases, they are the only industry or the largest employer. Apparel and fabric retailers are to be found in every major city, in every suburb and in the smallest of towns.

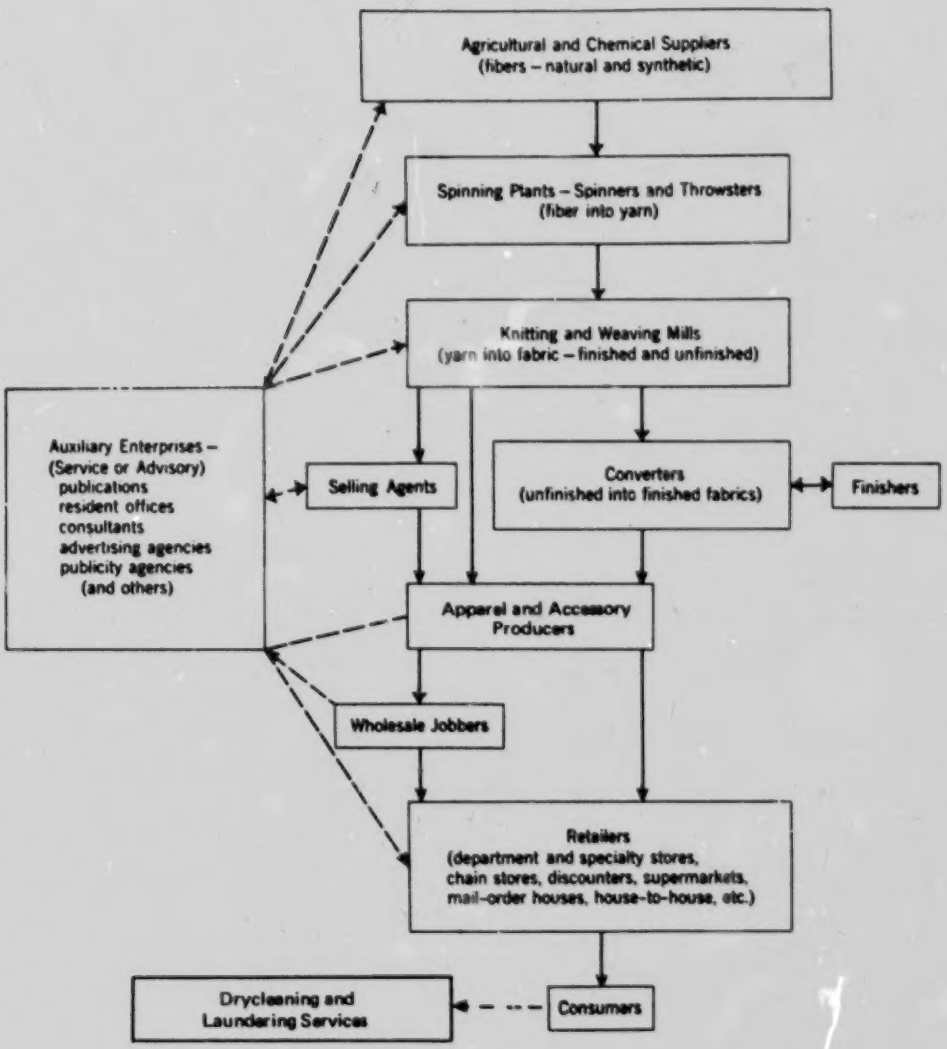
BROAD RANGE OF OCCUPATIONAL OPPORTUNITIES

Numbers alone, however, do not tell the full story of the importance of the fashion industry as a field of employment opportunity. The industry is many-faceted and offers a host of varied entry-jobs and career opportunities. It employs workers with every degree of skill and educational preparation. Training and/or experience in one segment is often an asset applied to another. Working conditions and financial compensation are satisfactory, and good pay is a by-product of good training, good job performance, good experience and good breaks. Pay rates vary from city to city, from company to company and from time to time.

There is a place in the industry for people of many different types and levels of skills which require diverse talents, interests and educational preparation. Technicians and artists, chemists and engineers, originators and copyists, cutters and sewers, buyers and sellers, administrators and entrepreneurs . . . . all these and more constitute the variety of occupational opportunities in the complex of industries involved in the design, production, distribution and servicing of textiles and apparel products.

*Source of figures: *U.S. Industrial Outlook 1973*, U.S. Department of Commerce.

FASHION INDUSTRY FLOW CHART



UTILIZATION OF THE GUIDE

Schoo. personnel using this guide will find that modifications can be easily made to fit the local conditions of their specific situation. The design of the suggested overall program is such that areas of instruction can and should be combined or eliminated entirely in adapting the program to meet local needs.

STRUCTURE OF THE PROGRAM

The components of the program contained in this guide are based upon the differing performance requirements of different levels of employment responsibility. The program, therefore, reflects levels of competency to be achieved rather than levels of education, thereby facilitating its adaptation and use by secondary schools, post-secondary institutions and other types of training centers.

The basic skill development areas of instruction correspond to specific competencies needed for basic entry jobs and aim to prepare students for initial employment. The advanced areas of instruction progress in depth, scope and complexity of content and are designed to serve the needs of students who have more advanced career goals and/or greater educational or employment experience. The fundamental background areas of instruction, although not always essential for some basic skills, broaden the students' understanding of the occupational field and enhance their opportunities for job satisfaction and career progression. Where necessary for the development of specific skills, they are noted as prerequisites in the outlines of the areas of instruction.

The areas of instruction in the guide and the teaching modules in the instructional guidelines are flexible enough to allow for vertical and/or lateral occupational training plans. For example, enrollees in the program can:

1. *Either* progress laterally, component by related component, from simple to complex job skills in such a way that they can exit at varying points with a mastery of a specialized skill, if they choose not to complete the entire program.
2. *Or* enter the program at wherever they are occupationally and move vertically (or laterally) as far as they can or choose.

CONSIDERATIONS IN ADAPTATION AND MODIFICATION

The number of the different areas of instruction that are offered, the manner in which they are combined, the emphasis that is given to the different levels of areas of instruction, and the comprehensiveness of the program will depend upon:

- The type of educational institution in which the program is being offered: for example, an adult training center would be less likely to offer the entire program than a post-secondary school.
- The time available for the program: for example, it would be more advisable in a one-year program as contrasted to a two-year program, to eliminate complete areas of instruction rather than compromise the development of specific competencies desirable for meaningful employment.
- The occupational opportunities in the community: for example, it would be wiser to put the emphasis on print design instructional areas rather than on woven design if employment opportunities in the weaving field are nonexistent or limited in the community.
- The job levels for which the program is designed: for example, little or no emphasis should be put on career-advancement areas of instruction if the objective of the program is to prepare students for basic-skill entry jobs.
- The nature of existing programs in the educational institution: for example, complete areas of instruction in textile design could be substituted or added, and offered as an option to students who are enrolled in currently existing textile or art programs.
- The students' special needs and occupational goals: for example, being responsive to students' individual needs in terms of where they are and what they wish to be.
- The opportunities that are available to the students for continuing study and articulation with advanced job-preparatory programs: for example, a

secondary school in a community which does not offer post-secondary job-preparatory programs should include career advancement areas of instruction; a secondary school in a community in which post-secondary job-preparatory programs are already in existence might do better to concentrate on fundamental background and basic skill-development areas of instruction.

TIME ALLOTMENTS

The hours to be allotted to each area of instruction should also be modified and adapted to suit local situations. However, it is suggested that certain teaching-modules and/or complete areas of instruction be eliminated rather than weaken the development of skills needed for job entry.

THE TEXTILE DESIGN FIELD

The basic function of the textile segment of the fashion industry is the conversion of raw fibers into finished fabrics. At one end of the industry spectrum, it draws upon the suppliers of natural or man-made fibers. At the other end, it markets the finished fabrics to manufacturers of end products or to fabric retailers.

There are almost 7000 textile production plants collectively employing close to one million workers. These mills perform one or more of the three basic processes involved in the production of textiles; the spinning of natural or synthetic fibers into yarns, the weaving or knitting of yarn into fabric, and the finishing of fabric to impart color, texture, pattern, ease of care, and other characteristics. Some mills stop at the gray-goods stage with unfinished fabric, which is then ready to be styled and processed by a converter. The textile converter may have the fabric designed in his own studio or buy designs from outside studios specializing in this service, and then have it finished or processed in a dyeing, finishing, and/or printing plant. Still other textile enterprises have a vertical set-up and do the complete job, starting with the raw fiber, finishing it, designing it, and marketing it to manufacturers or retailers.

Textile mills are largely situated along a broad arc reaching from New England through the Southeast and into Texas. Designing, styling, and sales activities, however, are heavily concentrated in New York, with some lesser design and sales centers in New England, Philadelphia and the West Coast.

The textile segment of the fashion industry complex has been described as being "at one and the same time, an industry, an art, a science; an *industry* in its manufacture of raw materials into useful products; a *science* in the application of research and technology to its products and manufacturing processes; an *art* in the creative styling and design of fabrics." (ATMI, Charlotte, N.C. – *Your Career in Textiles*).

Geographic Distribution of Textile Products

COURTESY OF AMERICAN TEXTILE MANUFACTURERS INSTITUTE

MANPOWER NEEDS

Few American industries place as great a premium upon creativeness and artistic expression as does the textile segment of the fashion industry. Textile designers, colorists, fabric stylists, repeat artists, screen printers, weavers——all have a hand in the creation of new fabrics. In an industry where as many as 10,000 different designs are produced in a single year, there is a wide variety of occupational opportunities for those with creative talent and appropriate preparation. The increasing interest in fashion, paralleled by the impact of technological developments in the industry, is creating a growing need for textile design personnel to meet the continually growing and rapidly changing needs of this nation.

DESIRED COMPETENCIES

A textile designer is a person who creates the patterns or designs for fabrics, whether structural, as in woven or knitted design, or whether applied to the surface of a fabric, as in printed design. In general, print designers paint their designs on paper for reproduction by such printing processes as machine rollers and screen printing, as contrasted to designers of structural fabrics who plan or plot their patterns and designs for weaving looms or knitting machines. Often, the designer for woven fabrics may work directly on a small loom weaving sample fabrics while knitwear designers will create their designs on a sample knitting machine; both must adhere to their technical limitations and plot their designs for eventual mass-production.

Many of the basic competencies, aptitudes, and skill-development experiences vary for the different types of textile designing. The print designer must have an inherent art ability or aptitude along with a working knowledge of textiles, fabric construction, and printing processes. For the structural designer, the ability to draw is an advantage but not a necessity. Designers of woven or knitted fabrics require a greater depth of knowledge about yarn characteristics, technical processes, and machine capabilities. They must also be skilled in the usage of textile loom or knitting machines. Equally important for both are a vivid and fertile imagination, a real feeling for color and design aesthetics, a good tactile sense, a sensitivity to customers' desires, and the ability to visualize the effect of their designs on cloth.

Fabric designers tend to become specialists in a particular field for several reasons. One reason pertains to the high degree of specialization within the structure of the industry itself. Another factor is that one person seldom possesses the aptitude, interest, or preparation in all of the artistic and technical competencies necessary to make him or her efficient in all types of designing.

EDUCATIONAL PREPARATION

To a greater or lesser degree, depending upon the area of design specialization, the tools of a textile designer are color, paint, paper, design techniques, fibers, fabrics, and textile processes. The best training for the aspiring textile designer is to become conversant with the different areas of textile design through a series of introductory and basic skill-development educational experiences that are applicable to all. These basic experiences can then be followed by further educational and/or on-the-job training in the specialized design area that best suits the individual's aptitudes, interests, and/or job opportunities. Other skill-development studies such as printmaking, graphic design, photography, jewelry designing, and draftsmanship are related areas which interested students might explore in order to widen their future career possibilities.

As important as the vocational training that contributes to the students' technical competency are other disciplines that expand the social and personal development, and the life skills of the students, and that broaden their understanding of the socio-economic forces that affect the fashion industry. Of particular help to textile design students are studies in art history and appreciation, social studies, foreign languages, and communication skills.

OCCUPATIONAL OPPORTUNITIES

Regardless of the area of specialization, the field of textile design offers many entry jobs and career opportunities for those who have a feeling for pattern, a love of color, manual dexterity, a technical proficiency in design techniques, and a working knowledge of textile processes.

While the designing and styling activities of the textile mills and factories that are located all over the country tend to be largely concentrated in New York, the fact remains that an increasing number of textile firms are employing artists who are capable of designing, coloring, and doing repeats, and that textile activity does spread throughout the U.S. Burlington Industries, for instance, maintains carpet mills in Georgia, several weaving mills in Mississippi and Texas, vinyl plants in Massachusetts, design studios in New York and New Jersey, and other textile activities in North and South Carolina, Virginia, Tennessee, Alabama and California. Pennsylvania and Rhode Island are also important mill-operation states.

Moreover, basic preparation in textile designing can also lead into a variety of occupational design opportunities in many other parts of the country depending on the individual's talent and ingenuity in adapting it to local situations. Designing greeting cards, packaging, illustrations, and home furnishings are but a few of the wide range of employment opportunities, not to mention the possibility of free-lance designing.

Independent textile design studios from whom textile concerns, large and small alike, purchase designs are a major factor in the operations of the industry and offer the beginning designer opportunities to get started in a career. Another important source of placement opportunities are in the independently-owned or vertically-integrated textile converting firms that style and finish the unfinished fabrics produced by mills. Initial designing opportunities within mills themselves are more limited since, in some mills, the designer must be as much, if not more, a technician than an artist and must be thoroughly conversant with factory routines and processes.

Print studios need colorists to render patterns more diverse and marketable, designers to originate new style trends, repeat artists to enable the printing of patterns, mill stylists to supervise a first printing at a mill and a stylist who is usually in charge of the studio and who is responsible for its artistic output. It is through the judgment and fashion intuition of the stylist that a new "line" of designs is put into production and tested by consumer response. This is the most responsible position in a studio. The work of the stylist does not necessarily require drawing and painting and is usually handled by someone extremely knowledgeable and experienced in the textile business.

Each particular studio, whether independent, converter, or part of a larger vertical set-up, works in its own most practical way, defining responsibilities in the most advantageous manner. Therefore, the titles "colorist", "repeat artist", etc. are used simply to indicate the need for such expert assistance. Whether these tasks are performed by several persons in the studio or absorbed by a fewer number will depend on the particular circumstances existing within them.

The screen printing area offers much the same varied opportunities. Interesting work may involve color mixing, working out repeats, doing overlays for photographic reproduction, printing, and varied other occupations. The knit and woven areas share the same need for competent and educationally prepared textile design personnel.

In short, textiles today provide a variety of challenging and satisfying beginning jobs and advanced career opportunities for the creative, the artistic, and the venturesome.

The following chart presents an overview and examples of textile design occupations, typical places of employment, and brief descriptions of what the workers do. Occupations are classified according to entry-level jobs and advanced career opportunities. Specific job titles and exact responsibilities may vary from place to place and are subject to change as technologies change and new positions are created.

PROFILE OF OCCUPATIONS IN TEXTILE DESIGN

Entry Jobs

OCCUPATION	PLACES OF EMPLOYMENT	WHAT WORKERS DO
Reference Swatch Organizer	Print Design Studios	Collect and catalogue reference pieces of existing and new designs for studio and mill use.
Colorist	Print Design Studios Converters Textile Print Plants (Roller or Screen)	Match colors and paint combinations of existing patterns for studios or print plants.
Color Coordinator	Print Design Studios Converters	Set up a new color palette for each season; direct and organize work of colorists.

(Entry Jobs continued)

OCCUPATION	PLACES OF EMPLOYMENT	WHAT WORKERS DO
Screen Printer	Screen Printing Plants Screen Engraving Plants	Place fabric on table, print it, and roll it up in preparation for curing.
Screen Maker	Screen Printing Plants	Make screens, prepare them with emulsion, expose them photographically and coat them.
Screen Printing Artist	Design Studios	Make color separations of accepted designs.
Runner	Weaving Mills Independent Design Studios	Keep sample books, yarn inventory and records; wash, iron and mount samples; wind bobbins.
Roller Engraver	Engraving Studios	Engrave the copper rollers used for print reproduction.
Beginning Weaver (layout worker)	Weaving Mills Independent Design Studios	Make warps and colorings to stylist's specifications.
Graph Artist Knit Designer Trainee	Knitting Mills Converters	Plot the designer's idea on graph paper; may act as liaison with the mill; follow up on mill strike-offs, and do comparison shopping.
Knitting Colorist	Knitting Mills Converters Independent Design Studios	Work out color combinations for designer's designs.

Advanced Career Opportunities

OCCUPATION	PLACE OF EMPLOYMENT	WHAT WORKERS DO
Sample Girl	Weaving Mills Independent Design Studios	Dress loom and weave samples to stylists' specifications.
Repeat Artist	Converters Free-Lancers Independent Design Studios	Given a croquis, repeat artists improvise within the design structure in order to put it into repeat for printing purposes.
Assistant Print Designer	Independent Design Studios Converters	Supervise studio and work in progress; design and originate patterns.

(Advanced Career Opportunities continued)

OCCUPATION	PLACES OF EMPLOYMENT	WHAT WORKERS DO
Print Designer	Print Design Studios Converters Free-Lancers	Originate designs for use in industry.
Print Stylist	Print Design Studios Converters	Organize and supervise studio work for maximum efficiency; work with clients and merchandising department in planning ahead for new designs; choose patterns from other sources for future production; assume responsibility for success of new 'line'; often alternate between studio and print plant when new patterns are put into production.
Color Mixer	Screen Printing Plants	Match colors in dye and mix in large quantities.
Screen Print Designer	Screen Printing Studios	Design acetates; put into repeat croquis; adjust existing design for size and taste requirements.
Production Weaver	Home or Craft Studios	Warp and dress loom; produce, on a hand loom, cloth and accessory fabrics for craft or boutique sales.
Weaver	Weaving Mill Studios Independent Studios	Dress loom; weave complex samples; initiate colors and patterns; test new fiber on hand loom.
Assistant Weaving Designer Assistant Stylist	Weaving Mill Studios Independent Studios	Oversee studio and work in progress; have responsibility for layouts and weaves.
Weaving Designer	Weaving Mill Studios Independent Studios	Design and originate patterns and colors of sample blankets to be woven at the mill, in coordination with merchandising supervisor.
Weaving Stylist	Weaving Mill Studios	Design the line; originate patterns; make color decisions; work with customers and salesman; supervise mill operations.
Free-lance Designer	Home Studios	Design, originate and develop designs for purchase by mills and/or independent design studios.
Studio Head	Independent Design Studios	Have design, management, and administrative responsibilities; design to clients' specifications and/or originate and develop designs for sale to textile firms.
Assistant Knit Designer	Knitting Mills Converters	Oversee work in progress; graph designers ideas; maintain liaison with mills; design original patterns.

(Advanced Career Opportunities continued)

OCCUPATION	PLACES OF EMPLOYMENT	WHAT WORKERS DO
Knit Designer	Knitting Mills Converters	Design and originate patterns; maintain customers' contacts; have total mill responsibility; plan color combinations.
Knit Stylist	Knitting Mills Converters	Style lines; coordinate colors; advise on trends; work with customers.

THE TEXTILE DESIGN PROGRAM

It is expected and suggested that the program in this guide will not be applied to a given situation exactly as outlined. The material is presented to illustrate what a comprehensive textile design educational program could include. It aims to provide a suggested framework within which such training can be developed.

PROGRAM OBJECTIVES

A job-preparatory program must concentrate on employment objectives if it is to prepare occupationally competent individuals. Its approach must be realistic, pragmatic, and must identify with specific competencies needed.

The development of occupational competency has at least six components around which a program should be designed:

1. Training should prepare the individual to be a productive employee in an entry level job.
2. The training, combined with a reasonable amount of work experience, should prepare the individual to advance to positions of increasing responsibility.
3. The training should give the individual an understanding and appreciation of all of the functions operating within the business enterprise.
4. The foundation provided by the training should be broad enough so that the individual can do further study within his field. No program can be considered terminal in the sense that the student stops learning. The further study may be the reading of trade publications, new text references, and/or formal education.
5. The technical training should be complemented by other educational disciplines which contribute to the social and personal development of the student. Employers want workers who are not only technically competent, but who have basic mathematical skills, who can communicate with people, and who can get along with others.
6. Training should develop the professional attitudes and behavior necessary to secure and hold a job.

The overall program suggested in this guide is designed to meet these requirements. It has been so structured as to lend itself to modifications and adaptations depending upon competencies to be achieved, time available for instruction, opportunities for employment, special needs and occupational goals of the students enrolled, varying types of educational institutions, and currently existing programs

DESIRED BEHAVIORAL OUTCOMES

The aim of the program contained in this guide is to enable students to acquire the specific abilities needed for immediate employment and to provide the knowledge necessary for career advancement and continuing study.

The program includes a common core of fundamental background and skill-development areas of instruction, followed by alternative career advancement instruction each of which corresponds to the specialized skills and proficiencies needed for employment in a specific field of textile design.

The common core aims to enable students to acquire the following competencies:

1. An understanding of fibers, fabric construction, and finishes as they affect the design of textiles.
2. A comprehension of the principles of color and design and an ability to apply them in designing for textiles.
3. A proficiency in drawing and interpreting flower and art forms as they apply to design.
4. A facility in painting with gouache and dyes and in using mixed media techniques for designing for industry.
5. An appreciation of the relationship between textile design and textile production — from design idea to printing, weaving, or knitting.
6. An awareness of the specialized equipment used in textile manufacture in terms of its design possibilities and technical limitations.
7. A knowledge of the terminology, working methods, and procedures functioning within the various design areas.
8. An ability to utilize design resources by adapting them to new ideas.
9. A recognition of good work habits relating to organization of time, presentation of work, neatness, accuracy, and self-criticism.

10. An understanding and appreciation of the operations of the textile industry as a whole.

The optional advanced instructional areas, as illustrated in the example of a comprensive textile design program which follows, aim to provide:

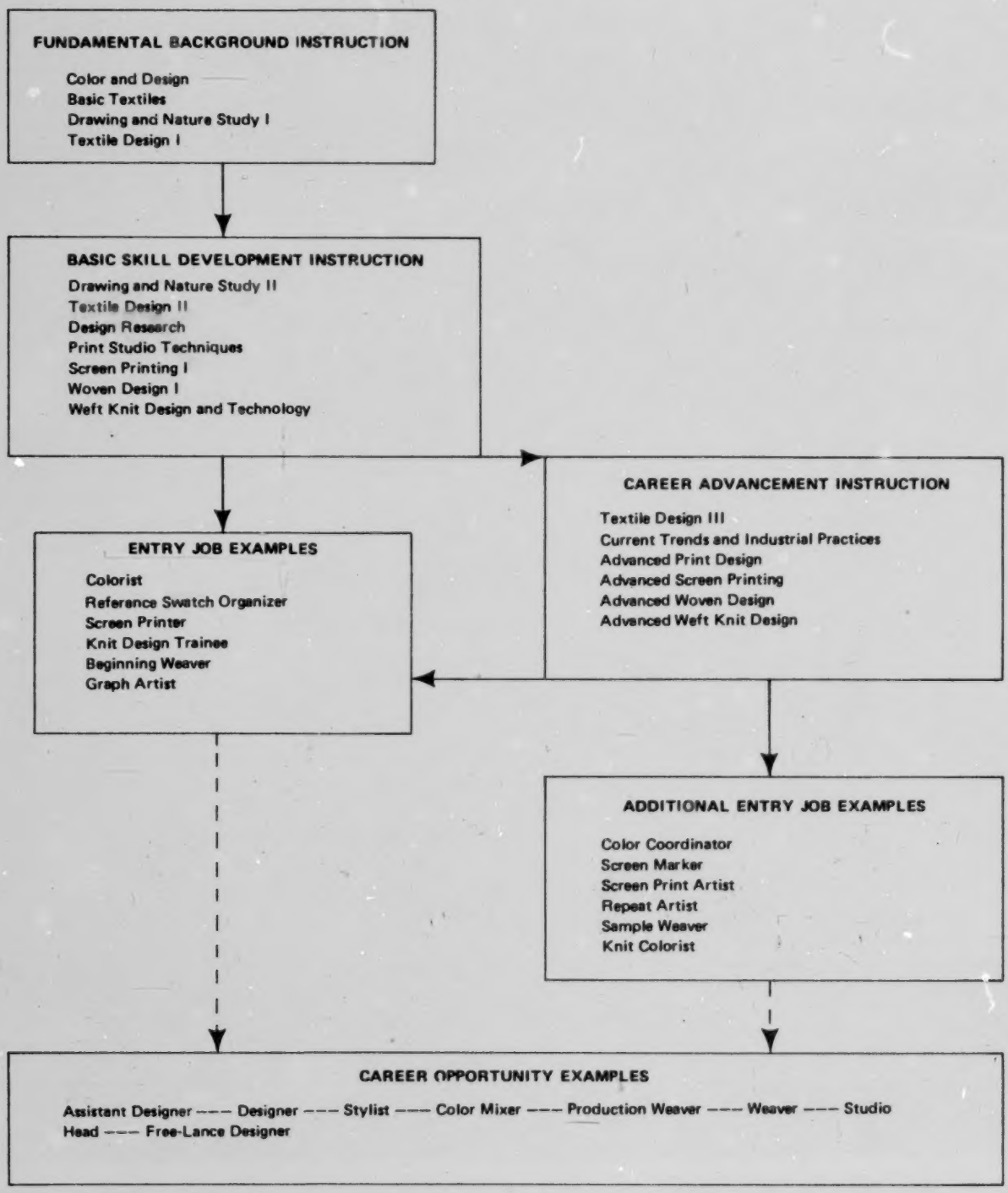
1. A facility in the techniques of a specialized area of textile design such as woven, print, knit, and/or screen-print designing.
2. A comprehension of the materials, equipment and technical demands of a specialized area of design.

EXAMPLE OF A COMPREHENSIVE TEXTILE PROGRAM*

Areas of Instruction	*Suggested Hours*
FUNDAMENTAL BACKGROUND	
Color and Design	90
Basic Textiles	60
Drawing and Nature Study I	60
Textile Design I	90
BASIC SKILL DEVELOPMENT	
Drawing and Nature Study II	60
Textile Design II	120
Design Research	75
Print Studio Techniques	90
Screen Printing I	60
Woven Design I	60
Weft Knit Design and Technology	60
CAREER ADVANCEMENT	
Textile Design III	120
Current Trends and Industrial Practices	30
Advanced Print Design	60
Advanced Screen Printing	90
Advanced Woven Design	60
Advanced Weft Knit Design	60

*This sample program can be modified in terms of hours and instructional areas to suit the time, facilities and objectives of varying types of educational institutions, the job goals of the students, and the job opportunities in the community.

THE PROGRAM AND OCCUPATIONAL RELATIONSHIPS



BRIEF OVERVIEW OF AREAS OF INSTRUCTION

Color and Design

Covers the basic principles of design and color and how each affects the other. Students become aware of design possibilities within the environment, and of color as a means of expressions.

Basic Textiles

Covers textile fibers, fabric constructions, and finishes, with major emphasis on finished fabrics. The elements in the manufacturing of fabrics are related to fabric hand, appearance, and expected performance properties.

Drawing and Nature Study I

Analyzes the design structure of flowers and other natural forms as a source of inspiration for textile designing. Students develop manual dexterity and skill with pencil, ink, gouache, and mixed media through stylized, natural, and conventional design interpretations.

Textile Design I

Introduces the principles of designing for industry through a study of technological limitations, such as roller sizes, various types of repeat, and color limitations. Students work out designs for children's wear and other specific markets.

Drawing and Nature Study II

Explores advanced techniques and experimental approaches to the art of drawing and observations with particular stress on line, form, and composition. Students develop traditional, Oriental, and impressionistic interpretations of florals

Textile Design II

Introduces the design of yarn-dyed fabrics, such as shirtings, ties, plaids, and checks, using gouache as the medium. Also covers the use of dyes on waxed rice paper in designing for specific markets.

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Design Research

Concerns itself with the evolution of form and aesthetics in design as it relates to textiles. Students gain practical experience in the use of historic documentation as a source of inspiration for modern design.

Print Studio Techniques

Gives practical experiences in the design techniques and procedures used in print studios. Covers such studio practices as tracings, coloring, overlays, references pieces, adaptations, color matching, repeats, textures, and the the like.

Screen Printing I

Covers the design and production of screen printed textiles from original idea to finished fabric. Students study dyes and the different fabrics to which they are suited, the finishing of fabrics, and the use and care of print room equipment.

Woven Design I

Provides experiences in the ways that woven fabric is designed and produced. Students learn how to design basic weaves and variations on the hand loom, and how to interrelate design, color, and type of weave into a finished fabric.

Weft Knit Design and Technology

Covers the technical possibilities and limitations that govern the design requirements for weft knitted fabrics and gives students experiences in designing for single knitted fabrics.

Textile Design III

Introduces the designing of textiles for markets such as decorative fabrics, wallcoverings, sheets, towels, and wearing apparel, using varied media. Printing techniques are stressed and emphasis is placed on flexibility in designing.

Current Trends and Industrial Practices

Covers the industrial practices, current trends, and different types of enterprises in the fashion industry complex, with particular emphasis on the textile industry. Teaching content and learning experiences help students to develop an understanding of career opportunities and an insight into the "workings" of fashion.

Advanced Print Design

Gives experiences in styling a line for a specific fashion market and season. Experimentation in design is encouraged and a professional approach to design is stressed.

Advanced Screen Printing

Gives advanced experiences in applying screen printing design and printing techniques to decorative wallpapers, panels, and dress fabrics. Students are introduced to the techniques of block print, tie and dye, and batik as sources of design effects.

Advanced Woven Design

Offers advanced instruction in weaving on multiple-harness floor looms. Students plan and weave a series of coordinated "blankets" and arrange them into a presentation portfolio.

Advanced Weft Knit Design

Provides skill-development experiences in the design and structure of double-knit fabrics. Students solve problems in adapting design to machines using various jacquard mechanisms, including electronic patterning.

GENERAL PROGRAM CONSIDERATIONS

There are many administrative factors to be taken into consideration before a job-preparatory program is undertaken or expanded. Questions such as the following require affirmative answers:

1. Does such a program meet a *manpower and educational* need in the State or community and at a reasonable cost?
2. Is the present faculty, if any, qualified or can qualified faculty be obtained?
3. Will there be adequate financial support to provide the program with the necessary facilities and equipment, and to maintain it by providing support for the proper instructional resources necessary for high quality programs?
4. Can provisions be made for effective guidance and placement services?

SURVEY OF NEEDS

The basic purpose of this or any other job-preparatory program is to prepare students for advantageous initial employment. It is obvious that a program of this type should not be undertaken unless:

1. There is every indication that it fills an educational or manpower need in the community or State and at a reasonable cost.
2. There is some assurance, as determined by a study, that there are advantageous and meaningful entry-job opportunities for enrollees of the program.

Those who believe that a program of this type may be needed in their institution should begin with a comprehensive regional, State, and/or local study. It should be made with the help of people acquainted with the textile industry needs in textile design. Such a survey is necessary to catalog the educational needs, to define community support, to evaluate available student population, and to form a basis for a decision as to whether or not to offer the program in whole or in part. Furthermore, no program should be undertaken unless there is strong indication that there will be a continuing need.

FACULTY

The effectiveness of a job-preparatory program depends largely on the competence and enthusiasm of the teaching staff. It is imperative that instructors in this program be occupationally competent through bona fide wage earning in relevant occupations, and to have had or be given instruction in the techniques of teaching. Occupationally experienced teachers not only add credibility and realism to a program, but they can be of invaluable help in counseling their students regarding job placement, and in guiding them through moments of technical difficulty and indecision.

The problem of identifying and recruiting qualified instructors is a very real one since it is difficult, if not impossible, to find teachers who are proficient in more than one specialized area of textile design. If vocational or technical teachers of textile design are unavailable on a full-time basis, some instructors may be recruited from industry who are available for teaching on a part-time basis. There are often industry professionals who are eager and able to teach 2 or 3 hours a day or some other agreed upon schedule. Also, some individuals who have retired from industrial positions, and who are physically and mentally alert, may be recruited as part-time instructors for areas of textile design in which they have had a successful experience.

Experience has shown that graduates of technical schools, who have acquired suitable employment experience, often become excellent teachers in job-preparatory curriculums. Persons with this background are more likely to understand the objectives, values, and unique instructional requirements of vocational-technical education and often bring to the program the kind of enthusiasm which has meaning to the students they meet.

Programs of an occupational nature need to be kept up-to-date if they are to be effective in preparing people for employment. In-service training programs should be developed and used to help instructors with teaching techniques, use of instructional materials, planning instructional procedures, evaluation procedures, etc., and to update instructors in terms of new industry developments. Faculty members should also be encouraged to maintain their contacts with industry and to participate as active members of professional and/or trade associations. Such contacts will serve as important sources of information for new instructional materials and for continuing reports of new processes, concepts,

developments, and student job opportunities related to their technology. A list of these trade associations and professional societies can be found in the Appendix.

STUDENT ENROLLMENT AND SERVICES

It is recommended that there be some system for enrolling students who have a reasonable expectation of succeeding in all or a meaningful part of the program, since the effectiveness and success of the program will ultimately be measured by the job-performance of its enrollees.

Students entering the Textile Design program should show some evidence of creative ability, a feeling for color, some knowledge of drawing, and imagination. A high degree of interest and motivation is desirable. Students who are specifically interested in print design should demonstrate an aptitude for drawing and/or painting. This might be in the form of some type of their own work to be submitted for evaluation, or in the form of an entrance examination in drawing. For weaving and knitting design, an ability to draw is not essential.

Above all, the students must enjoy designing and working with color. Design skills can be acquired but the motivation necessary for success will depend on students' genuine interest in their work.

General school records, aptitude test results, and information on exploratory experiences and activities can be useful tools in assisting potential students in making the decision on whether to enter this program or not.

Guidance and Counseling Services

Guidance and counseling are important in order to bring into the program students who have a basic understanding of the demands and rewards of the occupation, and who have the potential for developing the competence and confidence to meet the demands and achieve the rewards.

In view of individual differences, diverse occupational objectives, the variety of instructional areas, and the levels of training opportunity, the importance of informed and continuous counseling cannot be overemphasized. Teachers, coordinators and guidance personnel must assume responsibilities for:

1. Aiding students in their selection of educational and occupational objectives consistent with their interests and aptitudes.
2. Providing for assessment and recognition of individual student's competencies achieved or developed in previous educational programs and/or employment experiences.
3. Assisting students in a continual assessment of their progress toward their individual occupational goals.
4. Assisting students in revising their educational objectives if other interests and vocational goals emerge as students develop.

Students should also be involved in determining how much job preparation they want, how much they will undertake, and for how long. After completing their first goals, they could then be encouraged to participate in progressive levels of job preparation in order to broaden employment potential and satisfy maturing occupational choices.

Placement and Follow-Up Services

Effective occupational preparation is impossible if the school feels that its obligation ends when the students graduate. Placing the students on the job and following up their successes and failures provide the best possible information to the school on its own strengths and weaknesses.

An excellent placement record is important in attracting new enrollees. Also, a school which is successful in placing its students is more likely to have motivated students than a school which divorces itself from the placement responsibility.

Follow-up of employed graduates should be utilized to determine:

1. Graduates' success or failure in employment
2. Effectiveness and value of the program
3. Possible revisions to be made in the program

Competency Certification

In industries such as the fashion industry where employment certification is not prescribed, certification could be considered informal. Student records could be maintained in terms of the degree to which the student is able to perform one or more of the competencies needed for identified occupations. Another factor to be considered for competency certification is employer evaluations of the student's performance in cases where a cooperative traing experience is provided.

STUDENT ORGANIZATIONS

Student clubs that are related to an instructional program, should be encouraged and sponsored by faculty members. Groups such as these strengthen relationships among students, and develop leadership potential and an ability to work with other people. They also provide opportunities for students with similiar interests to

select and discuss areas about which they would like further information, and to invite guest speakers of their own choice.

These student groups should be directed by the students but faculty assistance and advice must be available whenever needed. To be encouraged, also, are affiliations with relevant student organizations that are national or statewide in scope, such as the Distributive Education Clubs of America.

ADVISORY COMMITTEES

The success of job-preparatory programs depends greatly upon the formal and informal support of industry advisory committees. Such committees serve without pay, as interested citizens.

The committee can be important as an aid in establishing, maintaining and/or evaluating the program. Members can also be helpful in recruiting faculty, placing graduates, recommending, and in many cases securing donations of, instructional equipment and materials, providing assistance and facilities for field trips, assisting with training stations for cooperative training, and the like.

The committee should be made up of representatives of industry, trade associations, related business and industry and, where appropriate, local labor organizations in the community, area, or State for which trainees are being prepared. Committee members should be appointed on a rotating basis so that the duty will not become a burden to any individual member. Rotating memberships will also give other interested people an opportunity to serve. The average committee usually consists of about 12 - 20 members. Members should be invited and appointed by the responsible educational authority. The duties and responsibilities of the advisory committee should be clearly understood so that maximum service can be rendered.

For further information about advisory committees see (1) American Vocational Association, *The Advisory Committee and Vocational Education*, Washington, The Association, 1969, and (2) Riendeau, Albert J., *The Role of the Advisory Committee in Occupational Education in the Junior College*, Washington, American Association of Junior Colleges, 1967.

COOPERATIVE TRAINING

A good way to develop employment skills is through actual employment. To the extent that the labor market allows, cooperative work training should be a regular part of a job-preparatory program. It may be scheduled for a block of time planned for full-time employment during peak business periods or for a period of time during which part-time school attendance is alternated with part-time employment.

When employment is used, it should be considered an essential element in the educational process and should be related to the field of study in which the students are engaged. For example, many of the learning experiences suggested in this guide can be adapted for completion at the students' employment sites.

When students test and apply their school-learned theory in a work situation, study becomes more meaningful. Just as important, the student has an opportunity to learn the importance of reliability, cooperation, judgment, and other qualities associated with the successful worker. Through this exposure to the real world of work students' career choices are stimulated and shaped. Should they find through their work experience that they are not fitted for a specific area of work, they may decide to change their field of study. This decision may prevent them from wasting their time on a misguided career choice.

Specific employment is obtained, as circumstances permit, by a teacher-coordinator or a placement office within the educational institution. The institution regards the cooperative training technique as an integral part of the program as a whole. It is not regarded primarily as an earning opportunity, although all students are paid wages that are commensurate with those paid to beginning workers in the particular job for which they are employed. Job evaluation reports are submitted to the school coordinator by the employer and are then discussed with the student. Work reports are submitted by the students to the classroom instructor(s) who utilize them to reinforce instruction.

The cooperative training technique offers important advantages to students, to the school, and to employers. It offers students an opportunity to gain the type of related experience that will make them more desirable as employees. As a result of their employment experience with a particular establishment, many students are offered permanent positions with that organization upon completion of their schooling. Regardless of their next steps, students establish employment records that are extremely important for future reference.

Cooperative education also provides opportunities for the educational institution to maintain close contact with employers. This contact becomes a valuable two-way channel of communication that helps the educational institution to keep its knowledge of specific employment needs up-to-date, and at the same time keeps employers acquainted with, and involved in, the program of the institution.

Ideally, students should be exposed to work experience after they have acquired some of the basic skills required

for entry jobs. At this point, they can render some meaningful service to the employer and, in turn, gain a realistic view into their chosen occupation. They will then be able to approach further study with a better understanding of the actual working conditions and career opportunities in their field.

Additional expenditures of time and money are necessary to locate work training stations, and to supervise and counsel the students who are assigned to them. Few expenditures, however, will bring a bigger return in linking education with productivity and in making schools effective in preparing young people for meaningful careers.

Specific suggestions for using the cooperative plan are available from vocational education directors in State Departments of Education.

SAFETY

Principles of safety should be taught and stressed as an integral part of each instructional area that involves handling of tools and equipment. By emphasizing careful procedures and by observing the normal safety practices, many dangers can be avoided.

The importance of protecting human life and limb is paramount, but students also need to learn good work habits and to develop a pride in workmanship. Teaching proper care and use of equipment is more important than teaching how to repair it as a result of negligence.

INSTRUCTIONAL EQUIPMENT

In determining and selecting instructional equipment, the need for every item should be established. Instructors should recognize that the purpose of laboratory and/or learning experiences is to teach or reinforce principles and basic skills. The latest and most expensive equipment is not always necessarily the best for instructional purposes. In many cases, simpler equipment may be more effective because it represents only the essentials. Equipment, however, should reflect current industry usage.

The possibility of getting donations of equipment from industry resources should be investigated by the local school or by the State vocational education offices. Advisory committees can be helpful in this area.

The instructional equipment and facilities suggested in this guide are planned for classes of approximately 20 students.

The ingenuity of the instructor, however will play the major part in governing the selection and cost of the instructional equipment. Suggestions for desirable facilities, specific equipment, and approximate costs are discussed in a separate section.

INSTRUCTIONAL MATERIALS

Specific instructional materials that are suggested for this program are included in the instructional outlines and are also discussed in the section on *Facilities, Laboratories, Equipment, Supplies, Costs.* The following are general suggestions for sources of supply for free instructional materials that can enhance instruction and also have financial advantages to the program:

1. Donations and/or loans of fabrics, fabric swatches, mill strike-offs, studio croquis, layouts and reference pieces, screen-printed fabric samples, design roughs, and the like, are often obtainable free of charge, from local or centralized design studios and textile producers.
2. Brochures, catalogues, and filmstrips from textile firms and textile trade associations are also obtainable free of charge.

LIBRARY SUPPORT

A school library is the major source for the reading, research, and reference facilities that are necessary to make an educational program fully effective. Instructors must recognize their responsibility for developing and enriching the resources of the library to support their program, and for stimulating student use of the library. Assignments and projects calling for the use of the library enable students to understand the research resources in libraries and how they relate to their present career choice.

A well-equipped library is mandatory for a textile design program. Many of the projects and learning experiences in the instructional areas are dependent upon the availability of pertinent and stimulating books as visual aids and research references. One of the important things that a textile designer must learn is to become self-sufficient as regards inspirational material. Therefore art books of many types, botanical studies, and art and fashion periodicals should be housed in the library. Only by using these independently can students learn to function well in the field of textile design.

TEXTBOOKS, REFERENCES AND AUDIOVISUAL AIDS

Due to the dynamic nature of the industry, techniques, fashions, products, and technologies are constantly changing. Textbooks, references and visual aids must be reviewed constantly in light of new developments.

The texts and reference materials that are suggested in the instructional area outlines should be examined by the instructor and analyzed for content and relevancy;

newer and more pertinent ones should be substituted as they become available. The information needed to cover a particular area of instruction is more often than not unavailable in a single text; hence the multiple listing of references.

In many areas of instruction, it will be necessary for the teacher to develop his own teaching materials. Reading references must usually be augmented by mimeographed material reproduced by the instructor from current materials in trade publications and/or by brochures, bulletins, and reports from trade associations and from business firms within the fashion industry itself.

Audiovisual aids can be a great help in teaching but must be previewed before use in order to determine their timeliness and pertinency to a teaching objective. Only a few have been listed in this guide because changes in techniques and procedures tend to make films obsolete in a relatively short time.

It is expected and hoped that a skillful instructor will make liberal use of merchandise samples, slides, transparencies, charts, industry materials, and other visual aids that illustrate and visualize technical aspects of the content that is being taught. These again must usually be collected and/or prepared by the individual instructor. They must also be updated regularly in order to keep them current. Some suggestions for visual aids are included in the instructional outlines, but the ingenuity of the instructor and/or department head must play the major part in the preparation and use of instructional aids.

OUTLINES OF AREAS OF INSTRUCTION

The outlines of the areas of instruction that follow contain the subject matter to be included, the behavioral objectives, and brief instructional guidelines. They are organized according to teaching modules each of which contains suggestions for teaching content and student learning experiences. Suggested hours, prerequisites, approaches for student evaluation, and teaching resources are also included for each area of instruction. It is recommended that these materials be modified to suit the needs of local situations and to take advantage of the special interests, capabilities, and ideas of the teaching staff in a particular institution.

The importance of flexibility in varying behavioral objectives to meet the needs of individual students, and in allowing individual students sufficient time to develop at least one employable skill, cannot be over emphasized. While the successful completion of all objectives for each area of instruction and for the program in its entirety is desirable, this is not attainable by all students. It must further be remembered that skill development can only be "learned-by-doing", and that what one student can learn in one week may take three weeks for another.

The role of the teacher in education has changed from being primarily an information giver in large group sessions to functioning as a resource person, a motivator, a diagnostician, and an organizer – in sum, a learning manager. It is incumbent upon the teacher to:

- Assess the individual student's present skills and potential.
- Identify those behavioral objectives that individuals can attain.
- Encourage students to acquire at least one if not more marketable job skill, allow them sufficient time to do this, and emphasize the importance and interdependence of all operations in an employment setting.
- Individualize desired behavioral outcomes in order to obtain a sense of accomplishment for all students in the class.
- Encourage and motivate all students to continually strive for higher goals.

Although individualizing instruction is not easy, it is necessary if the overall objectives of job-preparatory programs are to be achieved.

The suggestions for evaluation that are included in the outlines offer but a few approaches. Regardless of the evaluation techniques that are used and of their frequency – whether they be written, oral, or performance assessments – evaluation should be in terms of the desired behavioral objectives. In addition, students should be made aware of all objectives and kept aware of their own performance and progress as it appears to the instructor.

Fundamental Background Instruction

COLOR AND DESIGN

Prerequisites: *None*

Suggested Hours: 90

Behavioral Objectives

This area of instruction should enable the student to:

1. Know the basic principles and terminology of color.
2. Understand the various types of color contrasts which govern its perception.
3. Develop an individual feeling for color as a means of expression in designing.
4. Know the principles of design and understand, through practical application, how both color and design affect each other.
5. Understand and apply the many possibilities for variations in designing squares and checks.
6. Develop a facility for designing stripes and utilizing positive/negative effects.
7. Understand the principles and design possibilities of the 'turning square'.
8. Be conscious of rhythm, movement, and growth as important inspirations for design.

Instructional Guidelines

This area of instruction exposes students to the infinite possibilities of color as it affects design, and to those basic principles in art which constitute the foundation for later studies. The subject matter here presented has been condensed to offer a valid and useful background to any student and especially to those interested in any aspect of art and its related areas. The area of instruction has been arranged so that they may find practical advantage in following its various teaching points.

It is difficult to determine the number of projects needed for skill-development since much depends on the ability and performance of the individual student. Basic exercises in color and design are alternated with suggested projects involving personal interpretation and inventiveness. The paper method or painting with gouache are recommended media, with the choice based on the instructor's determination of which will best fit the student's abilities and needs. It is not necessary to use the same medium for all projects and alternating between the two media may prove the best approach.

For practical reasons, this instructional area is based on painting techniques. The student learns about color theory through visual perception and application. It is suggested that several indispensable color theory books be used in the classroom – e.g. *The Art of Color* by Johannes Itten, *The Interaction of Color* by Josef Albers, etc., to stimulate the student and demonstrate the various areas of concentration. In addition to these, it is suggested that the instructor collect as many color swatches of different materials (e.g. leather, glass, paint chips, buttons, etc.) as possible.

Emphasis is on color terminology as used in various areas of design. Several color systems are studied and appraised, a twelve-part color wheel is matched and painted for the student's reference and use. Several color exercises are performed which make the student aware of the versatility of color. Some learning experiences are basic, others involve a free choice of colors within the specified format; all are necessary for practical experience. The principles of the seven color contrasts and color as a means of expression are then studied and applied.

The design area teaches the student its basic principles and encourages a personal approach in project solutions. It is suggested that designed fabric swatches be supplemented by photographs of the works of Mondrian, Klee, and other graphic artists. Several projects involving the division of squares, checks, stripes and positive/negative effects teach the student various approaches to decorative design. Finally, the turning square and personal interpretations of rhythm, movement and growth complete the student's artistic discoveries.

It is recommended that students discuss all projects with the instructor before they develop them and that projects be mounted upon completion. It is further

suggested that group evaluations and discussions of finished projects take place whenever possible to offer the student an added stimulus towards developing objectivity and mature critical judgment.

Teaching Modules

I. Introduction to Color
II. Color Perception
III. Color as a Means of Expression
IV. Principles of Design
V. Divisions of Squares and Checks
VI. Stripes, Positive/Negative Effects
VII. The Turning Square
VIII. Rhythm, Movement, Growth

I. INTRODUCTION TO COLOR

Teaching Content

A. Color Approaches
   1. Impression
   2. Expression
   3. Construction

B. Color Terminology
   1. Hue
   2. Value
   3. Intensity
   4. Spectrum
   5. Tint
   6. Tone
   7. Shade
   8. Achromatic
   9. Chromatic
   10. Complementary
   11. Prism
   12. Analogous

C. The Color Wheel
   1. Primary colors
   2. Secondary colors
   3. Tertiary colors

D. Specific Color Systems
   1. Albert Munsell
   2. Wilhelm Ostwald
   3. Isaac Newton
   4. Ewald Hering
   5. Herbert Ives
   6. Johannes Itten
   7. Josef Albers

Learning Experiences

1. Have students work out an interesting composition on black paper (app. 9" x 12") using color strips cut from magazines. Students will then reproduce the same composition on white paper, and compare the results. Effects serve as basis for class discussions.
2. Have students choose two of the color theorists discussed in class, write a report of about 300 words on their experiments in color and compare their theories.

II. COLOR PERCEPTION

Teaching Content

A. Color
   1. Through comparison
   2. Through contrast

B. Seven Kinds of Color Contrast
   1. Hue
   2. Light-dark
   3. Cold-warm
   4. Complementary
   5. Simultaneous
   6. Saturation
   7. Extension

C. Black and White as Color Influences

D. Texture in Color
   1. Glossy versus flat
   2. Smooth versus rough
   3. Transparent versus opaque

Learning Experiences

Have students:

1. Paint a value scale in 12 steps leading from white (top) to black (bottom), mixing squares ½" in size. Students are to choose favorite color and paint its value scale going from light to dark, matching the brilliances to the corresponding values of the grays. The color will be most intense and pure at one step, above which it will be tinted by white and below which it will be shaded by black.
2. Paint a color wheel on 2-ply bristol in gouache, using Johannes Itten's 12-part color circle as an example. Colors must be matched perfectly. (Suggested size: 7" circle on a 10" square mount.)
3. Paint a color triangle using one hue, plus tints and shades.
4. Work out a composition illustrating monochromatic harmony, using tints, shades and tones of one color. This may be executed in paper or gouache.
5. Design a composition using complements: one color intense, one greyed – plus various tints, shades, neutral colors, and white or black.
6. Paint a triangle with orange, green and violet, to illustrate triads.

7. Work out a composition using tones of triads plus neutral tones of the colors. Have students use one or two colors in full intensity and the others muted.
8. Design a composition in which one color looks like two (through a change of background and the like).
9. Work out any color principle learned so far by re-interpreting it, using transparancies (colored acetates or colored tissue papers) in a new composition. Discuss with students the effect of overlapping and the different shades produced.
10. Paint a 1" square within a 3" square to illustrate the principle of simultaneous contrast.
11. Discuss contrast of saturation and then have them paint an illustration of the principle involved.
12. Determine concept of contrast of extension and paint an illustration of its working power, using two or more colors.

III. COLOR AS A MEANS OF EXPRESSION

Teaching Content

A. Color Moods
   1. Harmonious
   2. Contrasting
   3. Monotone
   4. Emotional (e.g. sad, happy, etc.)
   5. Vibrating

B. Working with Color
   1. Through values
   2. Through proportions
   3. Through color relationships

Learning Experiences

1. Have students express the moods suggested in teaching content, using their own sense of color as follows:
   a. Mix and paint checks of the colors they wish to use; work on one 'mood' at a time, varying colors as desired; mount each 'mood' combination together and label. Students are to group all exercises on one sheet of bristol paper. (Projects should serve as bases for class discussions.)
   b. Choose the 'mood' combination preferred and design an interesting composition using its colors in strips of varying sizes. (Suggested size: 11" x 14".)
2. Have students design an attractive composition utilizing strips of torn paper in analagous (related) colors, and gouache or mixed media.

IV. PRINCIPLES OF DESIGN

Teaching Content

A. Differences between Textile Design and Fine Art
   1. Unit of repeat
   2. Repetition

B. Elements of Design
   1. Line
   2. Direction
   3. Shape
   4. Size
   5. Texture
   6. Color

C. Application of Design Elements
   1. Repetition
   2. Alternation
   3. Harmony
   4. Gradation
   5. Contrast, opposition, conflict
   6. Dominance
   7. Unity
   8. Balance

D. Importance of Variety

Learning Experiences

(All graph projects are to be developed in pencil on tracing paper using ¼" graph paper sectioned by inches as the working background. Accepted designs will be backed and transferred to white two-ply bristol to be completed in gouache. The ¼" size check may serve adequately for color roughs and try-outs, but it is suggested that in the final version the square be enlarged to ½" or larger.)

1. Have students work out the following exercise within a 7 square by 5 square area; choose any series of number combinations (up to 7) for each row of squares, e.g.:
   - 1 6 7 2 4
   - 3 7 6 2
   - 4 3 5 1
   - 5 2 7
   - 1 3 5

   Students are to mark chosen squares to form a unit (see above) and assign a color to each number; paint unit according to the numeration; repeat unit at least three times horizontally and vertically.
2. Have students divide project in half (diagonally or vertically) by an imaginary line, and add a color to the white areas, thus producing a 'blotched' background. Discuss the effect obtained.
3. Have students draw a series of 25 one inch checks within a 5" by 5" square. Referring to the seven

elements of design, students are to work out a series of paired units within each check to illustrate the following: gradation, repetition, alternation, balance, opposition, unity, harmony, dominance. To simplify work, students may limit colors to red, blue, light gray, and black.

4. Have students choose the most successful unit designed in project 3 and re-interpret it on a larger scale, adding color and variety to design. (Proposed size: 5" square.)

V. DIVISIONS OF SQUARES AND CHECKS

Teaching Content

A. Variations in Designing Checks
   1. Basic (classic)
   2. Decorative
      a. Floral
      b. Geometric
      c. Divided
   3. Novelty
      a. Conversation motifs
      b. Variations in color, size and texture

B. Divisions of Squares

Learning Experiences

1. Have students design a series of four decorated checks (using a triangle, divided checks, a circle, etc.) and 4 colors; construct a complete unit of repeat using the following sequence:
   - 1 2 3 4 1
   - 4 1 2 3 4
   - 3 4 1 2 3
   - 2 3 4 1 2
   - 1 2 3 4 1

   Students are to repeat the unit *at least three times* vertically and horizontally.
2. Have students re-interpret the project above using 5 simple and varied checks and five complementary colors. Students are to construct a complete unit of repeat using the following sequence and repeat *at least three times* as done previously:
   - 5 4 3 2 1 5
   - 4 3 2 1 5 4
   - 3 2 1 5 4 3
   - 2 1 5 4 3 2
   - 1 5 4 3 2 1
   - 5 4 3 2 1 5
3. Have students design a unit of repeat using three shapes: two harmonious in two analogous colors and 1 contrasting, painted in a contrasting color. Students repeat the shapes several times to form a desirable layout.
4. Have students design a varied check using their imagination and as many colors as they wish in any sequence preferred.

VI. STRIPES, POSITIVE/NEGATIVE EFFECTS

Teaching Content

A. Stripes as Design Possibilities
   1. Types of Lines
      a. Straight
      b. Curved
      c. Vertical
      d. Horizontal
      e. 45 degree diagonal
   2. Line Decorations
      a. Geometric designs
      b. Free designs
   3. Variations in Lines
      a. Different widths
      b. Different colors

B. Positive/Negative Effects
   1. Use of color
   2. Use of design
   3. Use of texture

Learning Experiences

1. Have students design a varied stripe using four colors and contrasting edges, emphasizing the negative spaces between the stripes as an important visual area. Have them balance the stripe by beginning and ending with the same one.
2. Have students design an interesting diagonal stripe on a 45 degree angle emphasizing different widths, using any five colors preferred.
3. Have students design a horizontal stripe (bayadere) in which both straight and curved lines are combined and decorate, using two colors plus black and white.
4. Assign students to use positive/negative effects in designing a dramatic decorative stripe in black and white.

VII. THE TURNING SQUARE

Teaching Content

A. Definition
   1. Single motif
   2. Varying positions
   3. Unlimited design possibilities

B. Procedures
   1. Design unit
   2. Turning possibilities

Learning Experiences

1. Demonstrate turning square procedures as follows:
   a. Build a design unit within the square, avoiding:
      1) motif in center of square
      2) corner to corner decoration
      3) center to center interest
   b. Write TOP to determine position of the unit.
   c. Make four tracings of the unit and play with varying positions (flip, turn, diagonal, etc.) to achieve a satisfactory visual effect for entire unit of four squares.
   d. Back unit of repeat, drawing tiny cross marks at its corners.
   e. Rub down carefully on two-ply bristol, making sure that the register marks coincide perfectly.
   f. 'Turning' possibilities:
      1) one direction
      2) two directions
      3) four directions combined: flopped and turning
   g. Overlap the edges to avoid a 'framed' look.
   h. Work with two tracings side by side and *correct* in order to obtain a perfect unit of repeat.
2. Have students construct a design based on the principle of the turning square, painting in gouache and using up to four colors. Using two to five complementary colors and a different unit of repeat, students then develop a design involving a different arrangement from the one used previously.
3. Have students design a unit of repeat with overlapping edges, using four colors, and correcting all tracings according to desired effect. Students then paint the design.

VIII. RHYTHM, MOVEMENT, GROWTH

Teaching Content

A. Examples of Rhythm, Movement and Growth
   1. Musical
   2. Visual
   3. Emotional
   4. Artistic

B. Applications of Nature to Art
   1. Water
   2. Wind
   3. Clouds

Learning Experiences

1. Using as many varied materials as desired, have students develop a rhythmic composition in shades of one color and paste materials to two-ply bristol. (Project is to be at least 10" by 15" and will cover the board entirely). Suggested materials: glass, linoleum, leather, paint chips, buttons, string, feathers, fabric, yarns, and the like.
2. Borrowing all kinds of architectural elements from research sources or from the environment, have students design a pleasing composition emphasizing knowledge of drawing and application of color. (The project is to be approximately 10" by 15".)

Suggested Evaluation

Evaluation may be based on evidence of the students' ability to:

1. Demonstrate through the completion of class work (*at least 25 projects,* including exercises, compositions and personal interpretations) that they have been able to apply the basic principles of color and design, paint projects neatly, utilize a satisfactory technique, and adhere to time schedules.
2. Demonstrate their knowledge of color terminology.
3. Write a short report on color theories covered in teaching content which demonstrates their understanding.

Teaching Resources

TEXTS AND REFERENCES

Albers, J. *The Interaction of Color*
Anderson, D. *Elements of Design*
Bates, K. *Basic Design*
Birren, F. *Principles of Color*
Chevreul, M. *The Principles of Harmony and Contrast of Colors and Their Application to the Arts*
Downer, M. *Discovering Design*
---- *The Story of Design*
Graves, M. *The Art of Color and Design*
Hickethier, A. *Color Mixing by Numbers*
Itten, J. *Design & Form*
---- *The Elements of Color*
Jacobson, E. *Basic Color*
Munsell, A. *A Color Notation*

PERIODICALS

American Fabrics
Design
Domus
Harper's Bazaar
L'Officiel de la Couleur
Vogue

AUDIOVISUAL AIDS

The Vision of Color by Faber Birren, Series A, 35mm color slides
Van Nostrand Reinhold Co., New York, 1972
The Perception of Color by Faber Birren, Series B, 35mm color slides
Van Nostrand Reinhold Co., New York, 1972

INSTRUCTIONAL SUPPLIES

- Color Aid papers
- Color chips of all kinds of materials: buttons, cereals, feathers, glass, leather, paper, plastic, ribbons, strings, threads, wood, yarns, etc. (Students should be encouraged to find their own materials)
- Colored pencils or crayons or magic markers (in color)
- Compasses, rulers, pencils, erasers, sable brushes
- Fabric swatches related to simple check and color layouts
- Graph paper pad ¼" squares (sectioned by inches)
- Photographs or slides of the works of: Josef Albers, Johannes Itten, Paul Klee, Piet Mondrian, and others
- Tracing paper
- Red rope envelope 20" x 26"
- Winsor Newton Designers' Colors or Talens (tubes)
- 'Worthy' bristol Pad 11"x 14" or 14"x 22"

BASIC TEXTILES

Prerequisites: *None*

Suggested Hours: 60

Behavioral Objectives

This area of instruction should enable students to:

1. Use the terminology that is identified with the textile industry.
2. Know fabric characteristics as they relate to appearance, hand, expected performance, and end-product use.
3. Perceive the relationship between fiber properties, fabric types and end-product requirements.
4. Understand the major systems of yarn manufacturing and their effect on the properties of finished fabrics.
5. Comprehend the methods of fabric construction that determine the characteristics of fabrics.
6. Be familiar with the coloring methods applied to fabrics.
7. Be familiar with the various types of processes used on textile materials.
8. Be familiar with federal laws and regulations as they apply to fabrics.

Instructional Guidelines

This area of instruction is an introduction to textiles with major emphasis on finished fabrics. It is suggested that a representative cross-section of fabric swatches be distributed to the students and that frequent reference be made to these samples in order to illustrate various points. Traditional fabric types should comprise the major portion of the student's samples and the classical names for these fabrics should be employed. Fabric manufacturing should be related to fabric hand, appearance and expected performance, and these in turn should be related to end-product use. The study of finished fabric characteristics should be reinforced as the student progresses through the study of the various manufacturing elements that affect the end product.

Teaching Modules

	Suggested Hours
I. Introduction and Orientation	3
II. Fabric Characteristics	6
III. Fibers	9
IV. Yarns	6
V. Methods of Fabrication	15
VI. Dyeing and Printing	12
VII. Finishing	6
VIII. Federal Laws and Regulations	3
Total Hours ----	60

I. INTRODUCTION AND ORIENTATION

Teaching Content

A. What Are Textiles?
   1. Definition of fiber
   2. Definition of yarn
   3. Definition of fabric

B. Concept of Basic Textile Constructions
   1. Fiber type
   2. Yarn type
   3. Method of fabrication
   4. Method of coloring
   5. Finish

C. The Flow of Textiles (relationship between levels and functions of each).
   1. Fiber producer
      a. Natural
      b. Man-made
   2. Yarn mill
      a. Spinning
      b. Throwing
   3. Fabric mills
      a. Weaving
      b. Knitting
      c. Tufting
      d. Other
   4. Converters and their function
   5. Dyeing, printing and finishing plants
   6. End-product manufacturers
      a. Apparel
      b. Home Furnishings

c. Domestics
d. Industrial
7. Retailers

Learning Experiences

1. Have students examine the apparel they are wearing and distinguish between fiber, yarn, and fabric.
2. Have students make a list of business enterprises in local area that are involved in different levels of production and distribution.
3. Show and discuss film, *Cloth: From Fiber to Fabric* or *Textiles For Everyone.*

II. FABRIC CHARACTERISTICS

Teaching Content

A. Describing Fabric Appearance
   1. Color
   2. Pattern
   3. Texture
B. Describing Fabric Hand
C. Describing Fabric Weight
   1. By end-product use
   2. By typical industry terminology
D. Determining Face of Fabric
   1. Major characteristics
   2. Designer choice
   3. Factors limiting designer
E. Fabric Traditional Names

Learning Experiences

1. Have students go through various fabrics in the bundle of fabric swatches. Each fabric should be described, named if a traditional name is known for that fabric, and the face identified.
2. Assign students to find three traditional fabrics in their homes and classify according to fabric name, fibers used, description of the fabric and the end product.
3. Have students see how many different fabrics they can identify by traditional fabric name in their home.

III FIBERS

Teaching Content

A. Classification of Fibers
   1. By origin
   2. By generic class
   3. By filament or spun
B. Properties of Fibers
   1. Related to processing
   2. Related to fabric appearances, hand, and performance
   3. Major properties of each generic class
C. Modification of Fibers
   1. Chemical variations
   2. Modified physical shape
      a. Length
      b. Cross-sectioned
D. Methods of Fiber Identification (limitations and value of each)
   1. Burning and other simple test
   2. Microscopic examination
   3. Fiber identification stains
   4. Chemical solubility: quantitative identification
E. Grades of Fibers
   1. Cotton
      a. Staple length
      b. Grade
   2. Wool
   3. Man-made fibers

Learning Experiences

1. Demonstrate some simple tests such as the burning test, the wet-dry strength test, a simple acid test, to identify the fiber content of several unknown fiber fabrics and have students perform similar tests.
2. Have students examine their own wardrobes and make a chart showing the fiber content and the description of the end-product item. Room should be left on the chart to add information about the other elements of fabric manufacture that will be presented in this area of instruction.
3. Arrange a field trip to a fiber producer, cotton gin, cotton or wool warehouse, or the opening room of a mill during this module.
4. Show and discuss film: *The Way It Is With Man Made Fibers.*

IV. YARNS

Teaching Content

A. Types of Yarns and Properties of Each
   1. Spun
      a. Cotton system
      b. Wool system
   2. Filament
   3. Textured filament
   4. Stretch yarns
   5. Novelty yarns
   6. High bulk yarns
   7. Ply yarns

B. Twist in Yarn
   1. Direction
   2. Amount
   3. Importance and effect
   4. Relation to fabric type

C. Yarn Numbering Systems
   1. Relationship to weight
   2. Major systems used
      a. Denier: rule of denier
      b. Count: rule of count
      c. Tex: rule of tex number

D. Yarn Quality Factors
   1. Uniformity
   2. Neppiness
   3. Fuzziness
   4. Strength

Learning Experiences

1. Using a yarn of known size, have students approximate the yarn size of several yarns of unknown size. These may be taken from fabric samples given to the students and the effect of yarn size on the fabric hand and appearance can be discussed.
2. Select various fabric samples and have the students identify the quality factors of the yarns used, the type of yarn, and the relationship between the yarns and the fabric appearance and hand.
3. Have students refer back to the chart begun in the module on fibers and add to each item information about the yarn and its effect on the finished product.
4. Show and discuss film: *Yarns Used in Making Cloth.*

V. METHODS OF FABRICATION

Teaching Content

A. Woven Fabrics
   1. Loom motions
   2. Woven fabric terminology
   3. Basic weave formation
   4. Special weave effects
      a. Leno
      b. Pile
      c. Dobby
      d. Jacquard
   5. Fabric count

B. Knitted Fabrics
   1. How knit fabrics are formed
      a. Weft knitting
      b. Warp knitting
   2. Knitted fabric terminology
   3. Basic weft knit machines
      a. Jersey
      b. Rib
      c. Links
   4. Basic warp knit machines
      a. Tricot
      b. Raschel
   5. Fabric type produced on each of above machines
   6. Characteristics of knit fabrics

C. Tufted Fabrics
   1. How formed
   2. End-products in current use
   3. Characteristics

D. Non-woven Fabrics
   1. How formed
   2. End-products in current use
   3. Characteristics

E. Other Fabrication Methods
   1. Lace
   2. Braid

Learning Experiences

1. Arrange a field trip to local mills that either weave, knit, tuft, or produce non-wovens, and/or show and discuss film: *Construction of Cloth.*
2. Have students identify the fabrication method employed to produce the fabrics in their swatch bundle.
3. Have students refer to the chart started in the module on fibers and add information on the fabrication method and its effect on the finished fabric.

VI. DYEING AND PRINTING

Teaching Content

A. How Fabrics are Colored
   1. Solution dyeing
   2. Chemical reaction with dyestuff
   3. Resin bonded pigments

B. Properties of Dye and Fiber Relationships
   1. Affinity
   2. Relative cost
   3. Color fastness
   4. Metamerism
   5. Availability of shades

C. Major Dye Classes in Current Use
   1. Fibers on which each is used
   2. Properties of each class

D. Colorfastness
   1. Colorfastness and end-use

2. Simple tests

E. Methods of Dyeing
   1. Recognition of each
      a. Stock
      b. Top
      c. Yarn
      d. Piece
         1) Cross dye
         2) Union dye
   2. Reason for each

F. Methods of Printing
   1. Roller
   2. Screen
      a. Hand
      b. Machine
      c. Rotary
   3. Heat transfer
   4. Other methods

G. Types of Prints and Recognition
   1. Direct
   2. Discharge
   3. Resist
   4. Blotch
   5. Overprint
   6. Duplex
   7. Flock
   8. Burn-out
   9. Warp

H. Comparison of Wet-Process Prints and Pigment Prints
   1. Processing steps
   2. Cost
   3. Properties of each

Learning Experiences

1. Have students use a vegetable such as beets, onion, cabbage, etc. to prepare their own dyes. This is done by boiling the vegetable for a long period of time and then straining the solution. Then the students can try to dye a cellulose fiber, a protein fiber, and a synthetic fiber in the dye they made. These dyed samples can then be tested for colorfastness to light and laundering if the equipment is available.
2. Have students identify the method of coloring used on a variety of samples from the fabric bundles.
3. Have students refer to the chart begun in the fiber module and add the information on method of coloring.

VII. FINISHING

Teaching Content

A. Purpose of Finishing
   1. Alteration of hand
   2. Alteration of appearance
   3. Creation of performance characteristic

B. Nature of Finishing
   1. Mechanical processes
   2. Chemical additives

C. Major Types of Finishes and Fabrics on Which Used
   1. Preparatory finishes
      a. Shrinkage control
      b. Bleaching
      c. Singeing
      d. Others
   2. Basic finishes
      a. Calendering
      b. Napping
      c. Brushing
      d. Filling
      e. Mercerizing
      f. Others
   3. End-use finishes
      a. Flame retardants
      b. Water repellents
      c. Stain repellents
      d. Permanent press
      e. Others

Learning Experiences

1. Using treated and untreated samples of similar fabrics, demonstrate a water repellent finish and a flame retardant finish.
2. Have students identify the probable finishes employed on ten different samples from their fabric bundle.
3. Refer again to the chart begun in the fibers module and have the students add the information on visible or tactile finishes and expected finishes.

VIII. FEDERAL LAWS AND REGULATIONS

Teaching Content

A. Fiber Labelling Laws
   1. Wool Products Act
   2. Textile Fiber Products Identification Act
   3. Historic reasons for legislation
   4. Requirements of laws
   5. Definitions of terms
      a. Virgin or new fiber
      b. Re-processed fiber
      c. Re-used fiber
   6. Advertising requirements

B. Flammability Laws
   1. History

2. Current standards and test methods
3. Outlook for additional standards in future
4. Effect on textile industry

C. Care Labelling Regulations
1. History
2. *Current status*
3. Requirements
4. Standard and test methods

Learning Experiences

1. Have students bring in labels, or advertisements which feature labels, for evaluation and discussion of contents.
2. Using special, incorrectly prepared labels, have students identify the illegal labels and re-design them correctly.

Suggested Evaluation

1. Given a set of swatches, students are evaluated on their ability to recognize 40 to 50 basic fabrics by:
   a. Classic name
   b. Method of construction
   c. Type of yarn used
   d. Finishes where apparent
   e. Appropriate end-uses
   f. Expected performance of the fabric
2. Students are evaluated on their ability to do a cloth count of either a woven or knitted fabric.
3. Students can demonstrate their awareness of laws relating to textiles by documenting information provided by a salesperson or clipping news items.

Teaching Resources

TEXTS AND REFERENCES

Cowan, M. L. *Introduction to Textiles*
Hall, A. J. *The Standard Handbook of Textiles*
Hollen, N. and J. Saddler, *Textiles*
Joseph, M. L. *Introductory Textile Science*
Linton, G. E. *Applied Basic Textiles*
Potter, M. and B. Corbman, *Textiles: Fiber to Fabric*
Stout, E. E. *Introduction to Textiles*
Wingate, I. *Textile Fabrics and Their Selection*

PERIODICALS

American Fabrics
Daily News Record
Modern Textiles

AUDIOVISUAL AIDS

Cloth: Fiber to Fabric. 17 min., 16mm color film, sound
Encyclopedia Brittanica, Education Corporation, 425 N. Michigan Ave., Chicago, Ill. 60611

Construction of Cloth. 25 min., 30 color slides with written commentary and 20 fabric swatches keyed to program

Introduction to Textiles. 30 min., 32 color slides with written commentary and 18 fabric swatches keyed to program

Yarns Used in Making Cloth. 25 min., 32 color slides with written commentary and 22 fabric swatches keyed to program
Fairchild Visuals, 7 East 12th St., New York, N.Y. 10003

Textiles for Everyone. 15 min., color filmstrip, sound
American Textile Manufacturers Institute, 1501 Johnston Building, Charlotte, N.C. 28200

The Way It Is With Man Made Fibers. 27 min., 16mm color film, sound
E. I. Dupont de Nemours and Co., Product Information Section, Textile Fibers Dept., Centre Road Bldg., Wilmington, Delaware

INSTRUCTIONAL SUPPLIES

- Swatch bundles (as described in Instructional Guidelines)
- Fabric labels
- Samples of current fabrics
- Testing equipment and supplies

DRAWING AND NATURE STUDY I

Prerequisites: *None*

Suggested Hours: 60

Behavioral Objectives

This area of instruction should enable the students to:

1. Develop their hand in the execution of single line drawings.
2. Understand the botanical principles which govern leaf forms and how to utilize them in designing.
3. Become familiar with various line, color and technique applications.
4. Understand the botanical principles which govern flower forms and their growth and know how to interpret them for industrial use.
5. Understand how to draw various nature forms, such as shells, insects, etc.
6. Develop spontaneity and facility in the drawing and painting of fruits and vegetables.
7. Acquire speed and dexterity in the interpretation of nature forms, using various media.

Instructional Guidelines

Print textile designers must be equipped to meet the demands of industry. Competence in drawing and painting are prime factors in developing ability and in enabling them to qualify for first level entry jobs. This area of instruction enables students to develop the manual dexterity and flexibility required for textile design occupations. It encourages the study and interpretation of nature forms as a means to artistic expression and provides the instruction and background which will prepare students for more advanced areas of instruction in Textile Design. It makes students aware of the importance of observation and enables them to find the design potential in composition and in nature itself.

Flower forms are studied and drawn in various positions, stressing growth, movement, structure, and radiation as important parts of their visual beauty. At first pencil is used, then pen and ink, then color. Lectures on the quality of line, composition and shading brief the student in the art of self expression. Naturalistic and stylized interpretations are discussed as they affect the designer. Laboratory learning experiences provide the student with the instruction and guidance needed for technical advancement. They are organized as individual learning experiences, each providing the student with new and important concepts in designing. The suggested visual aids include real flowers, leaves, fruit, vegetables, and shells, to name but a few of the nature forms that may be used as inspiration.

The area of instruction may be divided into two parts: the first emphasizing shape, form, composition, and space; the second stressing interpretation and color. Each project is intended to offer students the maximum experience to serve as stimulation by their diversity and to encourage experimentation as a means to discovery and accomplishment. The techniques that are suggested develop discipline in the handling of tools.

Teaching Modules

I. Single Line Drawings
II. Leaf Forms
III. Techniques
IV. Flower Forms
V. Shells and Insects
VI. Fruits and Vegetables
VII. Quick Sketch Techniques

I. SINGLE LINE DRAWINGS

Teaching Content

A. Different Qualities of Line
   1. Flowing
   2. Accented
   3. Forceful
   4. Varied

B. Composition
   1. Examples of things to avoid
      a. Center interest
      b. Too much repetition

2. Examples of things to remember and use
   a. Variations of expression in color
   b. Variations of expression in line
3. Space as an important concept in composition
4. Overlapping versus no overlapping
5. The silhouette

Learning Experiences

1. Have students make two drawings of familiar objects using different qualities of line in two different compositions.
2. Have students draw a simple free form composition emphasizing space.

II. LEAF FORMS

Teaching Content

A. Analysis of Individual Shapes
   1. Veinings
   2. Edges

B. Foreshortened Views

Learning Experiences

1. Have students make three rough sketches of basic-type leaves, such as maple, oak, ivy, laurel, huckleberry, rhododendron and the like, to be evaluated by the instructor and one to be used as simple arrangement for a finished drawing. Have students emphasize quality of line, using a soft pencil.
2. Have students compose a simple arrangement of two or more leaf sprays using pencil or pen and ink.

III. TECHNIQUES

Teaching Content

A. Shading
   1. With line
   2. With color
   3. With technique

B. Naturalistic versus Stylized Interpretations
   1. Advantages of choice
   2. Reasons to use either

C. Stylizing a Flower or Nature Form

Learning Experiences

1. Have students make a series of three (3) drawings relating to different types of leaves and leaf sprays, using pencil and pen. Direct students to emphasize composition and shading.
2. Have students make a stylized drawing of a simple leaf spray, to be painted in four (4) colors, using gouache.

IV. FLOWER FORMS

Teaching Content

A. Flower Forms in Circular Perspective (daisy, simple type chrysanthemum)
   1. Analysis and observation of front and foreshortened views
   2. Foliage in perspective
   3. Principles of growth, structure, movement, radiation

B. Naturalistic Study and Analysis of Cup and and Saucer Type Flowers (tulip, daffodil, iris, petunia, morning glory)
   1. Views in perspective
   2. Foreshortened views of foliage

C. Flowers with Depth Construction (snapdragons, stock, gladioli)
   1. Structure and growth
   2. Foreshortened views

D. Rose and Bud
   1. Basic shapes and growth pattern
   2. The spiral in nature

Learning Experiences

1. Have students draw a flower arrangement in pencil, putting emphasis on form and growth and using shading.
2. Have students paint a balanced composition of mixed flowers and leaves using shading techniques.
3. Have students make a drawing of a group (at least three) of cup and saucer type flowers using pencil or pen and experimenting with line shading. Then have students paint the same composition in gouache using up to five colors.
4. Have students paint a simple composition in a monotone feeling, using three colors.

V. SHELLS AND INSECTS

Teaching Content

A. Shell Structure
   1. The spiral in nature
   2. Variations in color pattern and structure

B. Anatomy and Color Patterns of Winged Insects
   1. Butterflies
   2. Bees
   3. Dragonflies
   4. Others

Learning Experiences

1. Have students compose an arrangement of shells using pen, pencil or paint as the medium and using shading or color to bring out details and form.

2. Have students paint a butterfly naturalistically and then paint a stylized version of the same butterfly.

VI. FRUITS AND VEGETABLES

Teaching Content

A. Structure Studies
   1. Simple forms
      a. The sphere
      b. The cylinder
      c. Others
   2. Shading

B. Fruits and Vegetables as Design Motifs
   1. Natural interpretations
   2. Stylized interpretations

Learning Experiences

1. Have students make a series of sketches in pencil using different fruit and vegetable arrangements as inspiration and then choose one sketch to paint realistically in gouache.
2. Have students stylize the same arrangements, using up to five colors.

VII. QUICK SKETCH TECHNIQUES

Teaching Content

A. Reasons for Quick Sketches
   1. Spontaneity
   2. Skill development
   3. Self-assurance

B. Media for Quick Sketches
   1. Black and white gouache
   2. Color
   3. Mixed media

Learning Experiences

1. Have students make a series of ten-minute sketches of flowers, leaves, vegetables, and other nature forms studied using pencil or pen, and working out several compositional arrangements. Have students choose one of the drawings above and paint it in color, limiting their working time to fifteen minutes.
2. Have students make a series of five-minute sketches, trying to capture the essence of the nature forms chosen and then reinterpret one of above studies in color, limiting their working time to fifteen minutes.
3. Have students make a series of ten-minute sketches using brush and ink and repeat one of the sketches using color.
4. Have students make a series of sketches from memory, referring to any of the objects and nature forms studied and using any medium. Limit working time to fifteen minutes.
5. Have students paint a few quick sketches of chosen objects or nature forms, trying to capture their essence with spontaneous brush strokes and using gouache.
6. Have students compose an arrangement using the above studies as references and paint it on a black background.
7. Have students paint a series of studies using butterflies, flowers, leaves, vegetables, and the like as subjects and alternating compositional arrangements with free interpretations.
8. Have students paint a mixed bouquet in a balanced composition on a black background.
9. Have students continue projects until drawing competency and spontaneity have been established.

Suggested Evaluation

Evaluation may be based on evidence of the student's ability to:

1. Execute single line drawings.
2. Draw flower forms, utilizing their structural forms.
3. Use various line, color and technique applications.
4. Vary interpretations of nature forms such as shells, flowers, insects, etc.
5. Complete a portfolio of at least 15 finished drawing and painting studies which demonstrate progressive improvement in drawing and spontaneity, color and interpretation.

Teaching Resources

TEXTS AND REFERENCES

Barton, J. *Wild Flowers*
Borsig, T. *Designs in Nature*
Gollwitzer, G. *The Joy of Drawing*
Rottger, E. and D. Klante. *Creative Drawing, Point and Line*
Strache, W. *Forms and Patterns in Nature*

PERIODICALS

National Geographic

INSTRUCTIONAL SUPPLIES

- Botanical studies and photographs, slides, etc.
- Dried flowers and leaves, shells, feathers, etc.
- Flower and seed catalogues
- Real flowers, fruits, vegetables

TEXTILE DESIGN I

Prerequisites: *Color and Design; Drawing and Nature Study I*

Suggested Hours: 90

Behavioral Objectives

This area of instruction should enable the student to:

1. Know how to acqure and utilize valid methods of design research.
2. Understand the meaning and use of a croquis in industrial practice and know how to design one.
3. Understand the principle of the repeat in designing and its variations, and acquire facility in applying its technique.
4. Develop dexterity in the various painting techniques used in industry.
5. Understand the underlying principles and importance of color combinations in designing for fabrics and acquire the ability to develop them.
6. Become familiar with the various printing processes and technical limitations which affect designing for industry.

Instructional Guidelines

This area of instruction provides the foundation for further studies in printing methods by teaching students the technological requirements involved in the mass-production of a pattern. It stresses those basic steps in the art of textile designing which enable an idea to find its way from the drawing board to the engraving of a roller to the printing of a fabric. Laboratory sessions provide students with opportunities to search out an idea, evaluate it, design a croquis, and put the design into repeat. These steps constitute the basis for the work of a textile designer.

The art of painting suitable color combinations for patterns, and the various psychologies and practical reasons which make them necessary are included. The various printing methods used in the textile industry and pertinent information on roller sizes, repeat sizes, color limitations and the like should be presented in class lectures.

The learning experiences consist of five projects, the last of which is a planned repeat. A lecture-discussion should precede each learning experience, suggesting a certain need and intent for the design to be created. Students should be shown how to handle research material effectively, and be encouraged to start a notebook for their design ideas and color suggestions.

It is suggested that a minimum of three rough sketches in color be presented for each project for evaluation by the instructor before one is chosen to be put into a suitable layout. This simple method ensures students of greater design flexibility and enables the instructor to encourage the constructive use of at least part of their three ideas.

The learning experiences and skills acquired in this instructional area correspond to the techniques of design studios and prepare the student for further in-depth studies.

Teaching Modules

I. Acquiring Methods of Research
II. The Croquis
III. The Repeat
IV. Mastering Painting Techniques
V. Color Combinations
VI. Printing Processes

I. ACQUIRING METHODS OF RESEARCH

Teaching Content

A. The Importance of Creative Thinking

B. Sources of Information

C. Records of Design Ideas

D. Editing and Evaluation of Information

E. Translation into a Design

Learning Experiences

1. Using the environment as inspiration, have students choose three objects of everyday life which appeal

to them as design possibilities (for example, eyeglasses, india ink bottles) and make a three-color sketch of each one.
2. Have students choose three other objects from the reference books at their disposal and make a colored sketch of each of these.
3. Have students choose the best sketches from the above, and using three colors, refine the drawing and painting technique and enter in notebook.

II. THE CROQUIS

Teaching Content

A. Explanation of the Croquis
   1. What it is
      a. Design idea
      b. Example of the pattern
   2. Reasons for using
      a. Records idea
      b. Time-saving

B. Designing a Croquis
   1. Size of croquis
   2. Color balance
   3. Suggestion of layout

Learning Experiences

As an introduction to designing, have students paint three small croquis (6" x 9") suitable for women's wear or children's wear, using three colors. They may develop some of the motifs produced in Module I. Encourage students to try to create different spontaneous layout arrangements, using the same motif in different positions so as to develop an awareness of design possibilities. Have students enter these design ideas into a notebook for possible future reference.

III. THE REPEAT

Teaching Content

A. Types of layout
   1. Straight or set
   2. Half-drop
   3. All-over
   4. Stripe
   5. Bayadere
   6. Diagonal
   7. Border

B. Directions of Patterns
   1. One-way
   2. Two-way
   3. Four-way
   4. All-over

C. Development of Layouts

D. Sizes of Repeats: Common Roller Sizes
   1. 15" to 16½" vertical repeats
   2. Fractions of 15" to 16½"
   3. Flexibility of width

E. Determination of Repeat Sizes
   1. Size of motif
   2. Avoidance of sketches
   3. Other considerations

F. Procedures for Putting Croquis in Repeat

Learning Experiences

1. Demonstrate how to put a croquis into repeat as follows:
   a. Square off paper for accurate measurement.
   b. Experiment with different layout possibilities by making several quick tracings of the motif to be used. Tracings should then be 'flopped', turned upside down, to suggest the best possible arrangement.
   c. Arrange motif in line so that it repeats at desired position.
   d. Place side repeat at the half-drop position.
   e. Determine the width of the repeat.
   f. Make a good tracing of the final design.
   g. Transfer the tracing to good paper by burnishing.
   h. Paint the design, using gouache.
2. (Note: To facilitate the first student learning experience of the repeat, it is suggested that a set layout be used. The single motif of Module I may be placed into a rectangular shape (e.g. 1½" x 3") which can easily be adapted to a 15" roller size.) Have students design a set tailored pattern inspired by an object of everyday life. They may use the reference sketches from Modules I and II. Stress layout, with an accent on positive/negative spaces created by positioning the motif. Have students use two directions, up and down, and paint in three colors: one dark, one light, one bright.

IV. MASTERING PAINTING TECHNIQUES

Teaching Content

A. Opaque Background Wash with Gouache

B. Blotching in a Background

Learning Experiences:

1. Demonstrate how to paint an opaque background wash using gouache as the medium, as follows:
   a. Tack paper on to board.
   b. Mix enough color to cover area to be painted (paint must be neither too thick nor too thin).

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c. Have water and damp sponge at hand to prepare brush for painting.
d. Paint background with even horizontal strokes, going from top to bottom; then change direction to up and down (going from left to right) so that paint evens out easily.

2. Demonstrate how to blotch in a background as follows:
   a. Mix enough paint to cover area.
   b. Take painted croquis and proceed to apply background color between motifs, leaving attractive accents of white to facilitate printing.
   c. Try to section areas off so that join marks, if any, are neat.
   d. Paint in one direction to avoid streaking.
3. Have students design an all-over pattern in croquis form inspired by nature, using a free tossed arrangement and an analogous color scheme in four (4) colors and painting or blotching in a background.

V. COLOR COMBINATIONS

Teaching Content

A. Use and Importance
   1. Adds variety to new designs
   2. Revitalizes old patterns
   3. Promotes saleability
B. Color Combinations 'Weighed In' to Original Pattern
   1. Procedures for matching colors
   2. Utilization of color to change pattern look
      a. Experimentation
      b. Application of color theory
C. Size of Color Combinations

Learning Experiences

1. Have students design a bold sportswear pattern in croquis form for men's or women's wear inspired by geometrics and abstracts, using up to five colors.
2. Have students paint a color combination for the design, weighing in the colors to the original and maintaining color relationships.
3. Have students paint a color combination for the design, changing the look of the pattern and maintaining the same number of rollers.

VI. PRINTING PROCESSES

Teaching Content

A. Methods of Roller Engraving
   1. Pantographic method
   2. Photographic method
B. Types of Roller and Screen Printing
   1. Direct
   2. Discharge
   3. Resist
C. Methods of Printing
   1. Hand block printing
   2. Roller printing (copper)
   3. Screen printing
      a. Hand screen
      b. Flat bed machine screen
      c. Rotary screen
   4. Sublastatic paper (heat transfer)
   5. Others
D. Limitations of Color
   1. Reasons for color limitations
   2. Cost per color (roller or screen)

Learning Experiences

1. Depending upon community resources, take students on field trips to textile engraving and/or printing plants to observe varied methods of fabric printing.
2. Have students plan a suitable repeat for the croquis designed in Module IV or V and work on tracing paper with charcoal at first, then with pencil.
3. Have students back tracing and transfer the design to georgian, seminole or bristol paper (dull finish).
4. Have students paint the design in its original colors, extending it about three inches all around the repeat.
5. Have students continue projects until competency in all areas has been established.

Suggested Evaluation

Evaluation may be based on evidence of the student's ability to:

1. Apply valid methods of design research.
2. Paint a croquis.
3. Demonstrate understanding of the principles of the repeat and its variations by designing a pattern and putting it into repeat.
4. Complete *at least five* class projects successfully, painting them with a clean technique, showing good color sense.
5. Paint color combinations of patterns to 'weigh in' with original design.

Teaching Resources

TEXTS AND REFERENCES

Barton, J.G. *Wild Flowers*

Bates, K. *Basic Design*

Beitler, E. J. and B. C. Lockhart. *Design for You*

Boute, G. *L'Esprit de la Cpuleur*

Conran, T. *Printed Textile Design*

Downer, M. *The Story of Design*

Horning, C.P. *Reference Handbook of Designs and Devices*

Maurello, R.S. *Introduction to the Visual Arts*

Munari, B. *Discovery of the Circle*

Stevenson, R. L. *A Child's Garden of Verses*

Webster, M.D. *Quilts*

PERIODICALS

American Fabrics
California Men's and Women's Stylist
New York Times
Women's Wear Daily
Fashion magazines

INSTRUCTIONAL SUPPLIES

- Fabric swatches which illustrate teaching content
- Examples of studio croquis, repeats and color combinations

Basic Skill Development Instruction

DRAWING AND NATURE STUDY II

Prerequisites: *Drawing and Nature Study I; Textile Design II*

Suggested Hours: 60

Behavioral Objectives

This area of instruction should enable students to:

1. Comprehend the various techniques of floral painting and acquire spontaneity and speed in using them to interpret flower and nature forms.
2. Develop personal style and dexterity in the drawing and painting of nature forms through quick sketches.
3. Design various types of formal floral compositions using different techniques.
4. Design floral patterns suitable for industry utilizing a free interpretation of the painting techniques and compositional studies perfected.

Instructional Guidelines

This area of instruction provides the means for further student experimentation and development in refining those technical processes which are basic requisites for the textile designer. Students make analytical studies of old techniques and learn to master new approaches to design while developing their own individual style. Old prints, Oriental brush drawings, medieval tapestries and Impressionist paintings are studied and discussed in the light of their characteristics and artistic potential. Pencil, pen, gouache, dyes, crayon, and mixed media are used.

Quick sketches of flowers and plant forms loosen the hand and prepare the student for more formal compositions. Of these there are four: a botanical study, a study of Oriental brush techniques, a tapestry (warp) study, and a study of Impressionist painting methods. The formal compositions are then followed by personal free interpretations of nature forms suggested by them, to be painted in dyes or gouache. Emphasis should be on independent experimentation in order to provide students with the means for developing their artistic potential for imaginative expression.

Teaching Modules

I. Techniques
II. Quick Sketch Practices
III. Formal Compositions
IV. Free Interpretations

I. TECHNIQUES

Teaching Content

A. Botanical Studies: Old Print Techniques
   1. Research methods and materials
   2. Characteristics of botanical prints
      a. Medium of water color
      b. Illustration of growth pattern
      c. Others

B. Oriental Studies
   1. Research materials and methods
   2. Characteristics of Oriental studies
      a. Brush techniques
      b. Spontaneity
      c. Subtle coloring
      d. Expression
      e. Purity of line

C. Tapestry Warp Techniques
   1. Research materials and methods
   2. Characteristics of tapestry warp techniques
      a. Vertical warp effects
      b. Colorings
      c. Textured effects
   3. Modern interpretations versus authentic coloring

D. Impressionist Techniques
   1. Research materials and methods
   2. Characteristics of Impressionist techniques
      a. Looseness of strokes
      b. Vibrating colors

Learning Experiences

Using the appropriate research materials as models, and working from fresh flowers, have students:

1. Practice dye and pen techniques in the feeling of a botanical study and make several small sketches, emphasizing composition and detail.
2. Practice the brush and pen techniques using Chinese ink block brushes. Students are to try to capture the purity of line and freshness of stroke and make several studies until competency has been established.
3. Use gouache in trying to simulate the texture of a tapestry floral and make several small studies in croquis form.
4. Try to capture the feeling of an impressionist floral technique using any appropriate medium and any color arrangement. Students make several small sketches experimenting with different types of renderings, e.g. Van Gogh, Cezanne, Renoir, Seurat, Gaugin, etc. (Note: Have students keep all practice sketches for further studies.)

II. QUICK SKETCH PRACTICES

Teaching Content

A. Reasons for Quick Sketches
   1. Spontaneity
   2. Preparation for formal composition
   3. Development of speed and dexterity
   4. Development of a personal style

B. Media for Quick Sketches
   1. Ink
   2. Pencil
   3. Gouache
   4. Dyes

Learning Experiences

1. Limiting the working time to 10 minutes for each drawing, have students:
   a. Draw a simple flower or flower arrangement in pencil, emphasizing composition and shading, and repeat, emphasizing foreshortened view and structure.
   b. Draw two different compositional arrangements of nature forms in pen and ink, stressing spontaneity.
   c. Using gouache as a medium, paint two free interpretations of fruits, vegetables, or both.
   d. Draw a free form composition of flowers and leaves, using dyes as the medium. Students may "trap" colors and stylize forms.
2. Limiting working time to five minutes for each drawing, have students:
   a. Draw a single flower, trying to capture its feeling and form through the use of the varied line technique.
   b. Make a brush and ink study of a flower, trying to keep the strokes spontaneous and loose.
   c. Using gouache as the medium, paint a quick rendition of a leaf spray which they may stylize if they wish. Students are to use flat or water color shading.
   d. Paint a single flower in dyes using any technique.

III. FORMAL COMPOSITIONS

Teaching Content

A. Techniques for Formal Compositions
   1. Botanical study
   2. Oriental study
   3. Tapestry warp technique
   4. Impressionist technique

B. Characteristics of Formal Compositions

Learning Experiences

For each of the following projects, have students do a minimum of three color roughs, utilizing previous studies. Evaluate the roughs and choose one for completion.

1. Have students use gouache or dyes, with no color limitations, to develop and paint a finished study of the old print technique.
2. Have students make several quick sketches of flowers or nature forms using the Oriental brush technique with the emphasis on spontaneity and pureness of line. These are to be painted with Chinese brushes and ink.
3. Have students paint three croquis using the warp technique as center of interest, and using gouache as the medium. Have students develop sketches into a finished study.
4. Have students choose an Impressionist artist and make several color roughs trying to capture his or her technique. Have students select one rough and develop it into a finished composition of nature or abstract forms using the Impressionist feeling. Students may use any appropriate media.

IV. FREE INTERPRETATIONS

Teaching Content

A. Evaluation of Techniques
   1. Practicality in printing
   2. Desirability as design processes

B. Personal Adaptation of an Established Technique

C. Modification of Techniques
   1. Suitability to one's needs
   2. Avoidance of difficult printing details
   3. Limitation of color

Learning Experiences

1. Have students select one of the techniques learned in Module III and using up to five colors, make three color sketches in croquis form for a floral pattern. After evaluation by the instructor, one is to be chosen as a layout for a finished design.
2. Have students continue projects until competency and flexibility have been established.

Suggested Evaluation

1. Evidence which demonstrates the student's ability to apply the botanical study or water color technique, the Oriental technique, the tapestry warp technique and the Impressionist technique to the interpretation of flowers and nature forms.
2. Evidence of student's ability to draw quick sketches (5 and 10 minutes' working time) which demonstrate style and dexterity.
3. Evidence of student's ability to use a given number of different techniques in designing a specified number of formal flower compositions.
4. A completed portfolio of a minimum of 15 class projects which demonstrate flexibility of "hand" or technique, and competency in drawing, composition and the use of color.
5. Evidence of the student's ability to design a floral pattern which is suitable for industry use and which utilizes free interpretations of the painting techniques and compositional studies perfected.

Teaching Resources

TEXTS AND REFERENCES

Blunt, W. *The Art of Botanical Illustration*
Chaet, B. *The Art of Drawing*
Guichard-Meil, J. *Matisse*
Tetsuaki, K. *Shells of the Western Pacific in Color*

PERIODICALS

House and Garden
National Geographic

INSTRUCTIONAL SUPPLIES

- Fresh flowers, leaves, fruits, vegetables
- Dried flowers and leaves, shells, feathers, etc.
- Flower and seed catalogues
- Examples of different techniques

TEXTILE DESIGN II

Prerequisites: *Textile Design I*

Suggested Hours: 120

Behavioral Objectives

This area of instruction should enable students to:

1. Understand the technical differences between yarn-dyed fabrics and printed fabrics with a woven look.
2. Design for both types of fabrics, using appropriate techniques.
3. Acquire competency in designing for industry, using the waxed paper method and other techniques.
4. Know the various types of florals used in industry, utilizing both dyes and gouache as mediums.

Instructional Guidelines

This area of instruction introduces the student to two new designing methods: (1) the art of designing plaids and checks for yarn-dyed and printed woven fabrics, and (2) the technique of painting with dyes on waxed rice paper as used in the textile industry. Gouache is the medium to be used.

Teacher demonstrations are followed by practice sessions in which the students, guided by the instructor, learn to master the different techniques and develop their competencies. The procedures described in Module II apply to all woven design projects. A learning experience in a documentary-inspired stripe initiates students to the waxed rice paper method and is followed by several other suggested projects which help students develop their skills in this technique.

Different types of florals are described and discussed as important inspiration for the textile designer, especially the Liberty type pattern which is rendered in dyes. A lecture-discussion should precede each learning experience suggesting the need and intent for the design to be created. It is suggested that a *minimum* of three color roughs should be painted for each pattern for evaluation and discussion by the instructor and selection of one to be developed as the finished croquis layout.

A Madras plaid and the design for a man's necktie follow, and one of the floral croquis is put into repeat. Color combinations are suggested for several of the patterns, to keep students flexible and to afford them the maximum experience with color.

Teaching Modules

I. Yarn-Dyed Fabrics or Printed Fabrics with a Woven Look
II. Painted Woven Plaids
III. The Waxed Paper Method
IV. Types of Florals in Dyes and Gouache
V. Review of Design Techniques

I. YARN-DYED FABRICS OR PRINTED FABRICS WITH A WOVEN LOOK

Teaching Content

A. Printed or Yarn-Dyed Wovens
   1. Painted versus woven plaids
      a. Visual possibilities
      b. Limitations
   2. Color limitations
      a. Unlimited for warp
      b. Maximum of four for filling
   3. Technical requirements
      a. Neatness
      b. Accuracy

B. Types of Plaids
   1. Balanced
   2. Unbalanced
   3. Madras plaid
   4. Checks
      a. One-dimensional
      b. Two-dimensional

C. Sources for Research and Inspiration
   1. Color photographs from magazines
   2. Fabric or color swatches
   3. Textile design idea and color notebook

D. Decorative Possibilities
   1. Satin stripe (added thread)
   2. Ground dobby (warp thread)
   3. Clip spot (added thread)
   4. Cord (added thread)
   5. Top beam (added thread)
   6. Push cord (added thread)
   7. End and end (warp thread)
   8. Stitch cord (added thread)

E. Experimentation with Acetate
   1. Filling color
   2. Decorations on finished plaids

F. Ombre Effects
   1. Through strength of color
      a. Monotone
      b. Varied color
   2. Through width of stripes

Learning Experiences:

1. Direct students to select a few colored magazine pages and isolate those shades which they feel will reproduce their color feeling. These are to be discussed with the instructor and one chosen for matching color to photograph in quantity to be used for project #3 in following Module.

II. PAINTED WOVEN PLAIDS

Teaching Content

A. Application of Woven Design Techniques to Paper

B. Experimentation in Woven or Printed Stripes

C. Steps in Painting Woven or Printed Stripes

D. Steps in Stippling Woven or Printed Stripes

Learning Experiences

1. Demonstrate:
   a. How to apply woven design techniques to paper using gouache
      1) Mount paper on metal edge board (16"x21").
      2) Use a metal T square and right triangle on metal edge board.
      3) Use ruling pen.
      4) Stipple with straight edge bristle toothbrushes to obtain a woven effect (40% coverage).
      5) Use paper for measuring instead of a ruler.
         a) Encourages freedom
         b) Encourages inventiveness
   b. Procedures in planning stripes
      1) Experiment with color dabs.
      2) Experiment with width of stripes.
      3) Experiment with position and repetition of colors within the repeat.
      4) Experiment with the size of the warp repeat.
      5) Experiment with filling repeat possibilities following the same procedure as above, keeping the number of colors to a maximum of four.
   c. Painting a woven or printed stripe
      1) Square off the stripe area on 2 ply bristol paper using a metal T square and right triangle.
      2) Mark off the warp repeat measurements accurately at top and bottom of the paper, indicating color to be painted within each stripe and leaving a one inch margin at either end for practice space. (Show repeat at least twice; begin and end with the same color, possibly with the same stripe).
      3) Paint an even number of stripes, alternate light and dark.
      4) Paint in light colors first, free hand, going over the edges slightly on either side.
      5) Draw in the side of a darker stripe using the ruling pen and appropriate color.
      6) Fill in stripe carefully with the same color, using a regular brush.
   d. Stippling a woven or printed woven stripe
      1) Mark off the filling repeat at either edge of the paper, indicating color to be used.
      2) Section off area to be stippled with paper and masking tape. (Frisket paper or stipple bars can also be used).
      3) Stipple filling colors onto painted warp stripes using straight edge bristle toothbrushes and a small straight edge butter or paring knife (40% coverage). The air brush technique should also be demonstrated.
      4) Cut and mount the printed woven design, adding a one inch strip of the original warp at the top.
2. Have students paint a 14" long multi-color warp stripe in repeat, to be used for practice stippling. Students are to stipple each of four three-inch sections with a different color, concentrating on an even texture and 40% coverage. Colors to be used for stippling: (a) white; (b) contrasting color; (c) one of the colors appearing in stripe; (d) black. Have students mount, including one inch of the original warp stripe at the top.
3. Have students design an unbalanced plaid suitable for sportswear, using the colored photograph chosen in Module I and keeping the color feeling of the photograph. (Remind students that warp colors can and should be repeated within the

repeat as accents to create variation and interest and that the same may apply to the filling repeat).

4. Have students design a one or two-dimensional check suitable for children's wear and mount on white paper, including one inch of the warp construction at top.
5. Have students design an ombre stripe warp layout 18" long, divide it into two sections and create two versions of an unbalanced plaid, changing the filling repeats and colors to give different "seasonal" looks, for example, one for summer, one for fall. Have students mount as for project #4.
6. Have students design a balanced plaid suitable for sportswear, using variations of two complementary colors (e.g., yellow, purple, yellow plus black, yellow plus white, etc.) and mount as for project #4.
7. Using a sheet of prepared acetate over the finished designs, have students experiment with decorations and add them where suitable. (To be done for three of the four woven projects after discussing possibilities with the instructor). Decorative details will eventually be painted on the finished design with fine brush strokes or neat ruling pen and brush work. Remind students to observe and follow the direction of the thread when painting ground dobbies.

III. THE WAXED PAPER METHOD

Teaching Content

A. Waxed Rice Paper
   1. Advantages in making waxed paper
   2. Disadvantages in making waxed paper
   3. Utilization
      a. Elimination of tracings
      b. Cannot be erased or cleaned

B. Techniques of Dye Painting on Waxed Paper
   1. Slightly slanted board
   2. Colorflex, Non-Crawl or detergents
   3. Experimentation in mixing
   4. Use of "traps" or overlapping colors

C. Dye Painting on Unwaxed Paper
   1. Use of backed tracings or light drawings to transfer designs
   2. Elimination of Non-Crawl or other dye agents

Learning Experiences

1. Direct students to choose a culture whose decorative arts inspire them (e.g., Oriental, Persian, African), make a few studies of details that suggest design material, develop three of these ideas, and enter all reference studies into design notebook. Using reference materials, have students design a documentary stripe in up to five colors, suitable for women's wear or men's wear, and using dyes. The design will be in repeat and take either the vertical, diagonal or horizontal direction (bayadere).
2. Have students paint one color combination for the design, "weighing in" five different colors to the original, maintaining the same color relationships.
3. Have students paint one color combination for the design, using a monochromatic or analogous color feeling.

IV. TYPES OF FLORALS IN DYES AND GOUACHE

Teaching Content

A. "Bread and Butter" Floral

B. Stylized Floral

C. Liberty Floral

Learning Experiences

1. Using nature study sketches or notebook references of nature forms, have students design a "Bread and Butter" floral in croquis form, using gouache and up to five colors. Students are to paint two color combinations for the pattern, maintaining color relationships and "weighing in" colors to the original.
2. Have students design a modern stylized floral pattern suitable for sportswear, using gouache paint and one color, and painting on a white or colored ground. Boldness and a dramatic feeling are to be emphasized. Have students paint two color combinations for the same pattern.
3. Using appropriate floral research and nature study sketches as reference, have students design a Liberty floral for women's wear, using dyes and up to five colors. Have students experiment with traps (bonus colors, since they are automatically created by the overlapping of two colors). Adhering to the outline characteristic of the floral, have students try to interpret it as a personal expression of their color and design ideas.
   a. Have students paint two color combinations for the same pattern, maintaining color relationships.
   b. Have students paint a color combination of the same pattern creating a different color feeling (e.g., using pastels instead of rich colors).

V. REVIEW OF DESIGN TECHNIQUES

Teaching Content

A. Madras Plaid

B. Repeat on a Floral

C. Design for a Man's Tie

Learning Experiences

1. Following the procedures demonstrated and discussed in Modules I and II and using appropriate references, have students design a Madras plaid for sportswear. (Both warp and filling repeats should be varied, colors are to be deep and rich, emphasizing the "bleeding" Madras look).
2. Have students choose one of the floral croquis layouts just completed and put it into a suitable repeat, adhering to the technological limitations observed for roller printing. Have students paint the repeat in the same medium as the original.
3. Have students design a pattern in gouache suitable for a man's tie, using a printed woven effect, a stripe effect, or an abstract pattern. The design may be covered by a tie-shaped stencil or bristol paper for presentation.

Suggested Evaluation

Evaluation may be based on the students' ability to:

1. Demonstrate their understanding of the technical differences between yarn-dyed fabrics and printed fabrics with a woven look (e.g., plaids and the like).
2. Design for both types of fabrics, using appropriate techniques.
3. Paint in dyes on waxed rice paper as is done in industry.
4. Utilize both dyes and gouache in designing various types of florals.
5. Complete *at least 15* projects showing a progressive improvement in painting technique, originality, and adherence to time schedules.

Teaching Resources

TEXTS AND REFERENCES

Anderson, D. M. *Elements of Design*
Ballinger, L. B. *Perspective: Space and Design*
Bevlin, M. E. *Design Through Discovery*
Collier, A. M. *Handbook of Textiles*
Conran, T. *Printed Textile Design*
Kepes, G. *Vision + Value Series*
Laliberte, N. *Banners and Hangings: Design and Construction*
Mebane, J. *The Complete Book of Collecting Art Nouveau*
Montgomery, F. M. *Printed Textiles, English and American Cottons and Linens, 1700-1850*
Taylor, J. F. *Design and Expression in the Visual Arts*
Warren, G. *All Color Book of Art Nouveau*

PERIODICALS

Ambassador
American Fabrics (particularly useful is the "Madras" issue)
Elegance
Elle
Gentlemen's Quarterly
Harper's Bazaar
International Textiles
L'Officiel de la Couleur
Textiles Suisses
Vogue
Women's Wear Daily

INSTRUCTIONAL SUPPLIES

- Air brush equipment (Paasche) desirable, but not mandatory
- Beeswax, paraffin, a double boiler, a hot plate, a flat 2" brush
- Fabric samples of stripes of all dimensions and types
- Fabric swatches of checks, plaids (balanced and unbalanced)
- Fabrics with dobbies, clip spots and other decorative details that illustrate teaching points covered
- Frisket paper
- Samples of studio croquis of printed and yarn-dyed woven fabrics
- Sample studio layouts, croquis, color combinations, etc. painted on waxed and unwaxed rice paper with dyes
- Sample studio layouts, croquis, color combinations, etc. painted on various papers using gouache and other media
- Section liners, ruling pens, T-squares, metal-edged boards (16" x 21"), straight-edge bristle toothbrushes for stippling
- Stipple bars

DESIGN RESEARCH

Prerequisites: *Textile Design I*

Suggested Hours: 75

Behavioral Objectives

This area of instruction should enable the student to:

1. Understand how to master research procedures.
2. Know the visual importance of historical ornaments as a valid and desirable approach and inspiration to design.
3. Distinguish the difference between the adaptation and the adoption of design ideas.

Instructional Guidelines

Good designers must be conscious of the past, involved with the present, and intuitive of the future. They are aware of today's problems and living conditions, and have studied and frequently refer to the rich cultural periods of the past as an inspiration for new trends. This consciousness of historical art is one of the firm foundations on which the young designers can build their own productive structure.

This area of instruction is designed to provide the student with practical experience in acquiring professional methods of research as a stimulus to designing in general and to textile designing in particular. Major emphasis should be on the evaluation of form and design as it relates to textiles. Historical art periods should be studied and discussed with the purpose of extracting from them ideas for color and new designs. A notebook should be required in which students will catalogue their findings and on which they are to be evaluated.

The materials for design research are massive and much will depend on community resources and facilities. Instructors, therefore, must edit the suggested content to suit their particular situation and preferences.

Optimum community resources would include a nearby museum and a reference library. Slides can substitute for the lack of a museum but a reasonably well equipped reference library is mandatory. Class procedures would ideally alternate between museum and library trips during which students draw reference design ideas free hand, and classroom experiences in which students translate their references into designs suitable for fabrics.

Once guided by the instructor, students are encouraged to do independent research and record their findings in their design notebook. A short lecture on the historical background of the various periods to be surveyed should precede museum trips and the showing of slides or other appropriate material, so that the student may profit more knowledgeably from the learning experience.

There are five suggested projects. Each session will allow students time to use reference material and record their choice of design ideas from the various periods covered at the time. After several distinct art periods have been examined, the students will assemble their own material and transfer the best ideas to their notebook in color. The project resulting from this research is to be discussed with, and approved by, the instructor before being undertaken and completed. (It is important that students learn to evaluate and construct the 'look' of an art period rather than mix their research findings into one design. Inventiveness is to be encouraged, but students must be made aware of the need for both types of patterns). This procedure will be followed until all art periods are covered and five plates finished.

Teaching Modules

I. Research Procedures
II. History of Ornaments
III. Adaptation versus Adoption

I. RESEARCH PROCEDURES

Teaching Content

A. Defining Areas of Research

1. Environment
   a. Museums
   b. Architectural features on buildings
   c. Others
2. Library resources
3. Photograph slides
4. Retail stores

B. Recording of Research Materials
1. Modification for needs
2. Notebook entries for reference and use

C. Evaluation of Research Materials
1. Selection of design elements rather than historical objects
2. Commercial practicality of design ideas
3. Appropriateness for apparel and accessories

Learning Experiences

1. Assign students to select five design motifs from architectural features of buildings, homes, etc. of their environment and draw them free hand for future use.
2. Have students develop a border pattern in pencil using all or parts of the environmental design motifs from project #1 above and change motifs if it suits their needs. Direct students to transfer the most successful part of the exercise to their design notebooks.

II. HISTORY OF ORNAMENTS

Teaching Content

A. Primitives
1. Prehistoric
2. Historic
3. Modern

B. Ancient Egyptian
1. Assyria
2. Crete
3. Mycenae
4. Related Near Eastern cultures

C. Greco-Roman
1. Greek
2. Roman

D. Byzantine
1. Coptic
2. Islamic

E. Romanesque and Gothic

F. Persia and India

G. China and Japan

H. The Renaissance
1. Italy
2. France
3. England
4. Spain
5. Flanders
6. Germany

I. Baroque

J. Louis XIV, XV and XVI

K. French Empire

L. England
1. Wedgewood
2. Adam
3. Christopher Wren

M. Colonial and Early American

N. American Indian
1. Alaska
2. U.S. Indians
3. Mexico
   a. Aztec
   b. Mayan
4. Central America
5. Inca

Learning Experiences

After a brief lecture-discussion on the historical background of a selected number of inspirational areas and an explanation of the sources of research material available to the students, assign students to accumulate research material for future reference and class use. Suggestions for student research procedures are as follows:

Have students research a minimum of 5 different cultures and gather as many design ideas from each as they wish, which they find inspirational. Students are to transfer these ideas with proper documentation to their notebooks and enter them in alphabetical order according to the country of origin. Students may use color if they desire.

III. ADAPTATION VERSUS ADOPTION

Teaching Content

A. Copies versus Re-Interpretations
1. Copies
2. Re-interpretations
   a. Information
   b. Inspiration

B. Examples of 1900–1960 Adaptations
1. Art Nouveau
2. Art Deco
3. Bauhaus

4. Rodier
5. Dufy

C. Examples of Contemporary Adaptations
1. Pucci
2. Ken Scott
3. Jack Lenor Larsen
4. Dorothy Liebes

Learning Experiences

1. Have students use the research material gathered from one historic period (e.g., Persian, etc.) to design a documentary stripe suitable for men's wear. Remind students that the stripe can be varied and to try to balance its layout on paper by beginning and ending with the same stripe. Have students develop their design into a 5" half-drop repeat, show at least two extra inches all around, and paint in four colors with gouache.

2. Have students design an all-over pattern suitable for womens wear in croquis form using an interesting motif developed from a different documentary reference. Students are to paint the design in gouache, using three colors on a light background.

3. Ask students to find a design idea among their references to re-interpret into a tailored set pattern suitable for shirts or blouses. The design is to be in a 4" or 8" repeat (if alternating the colors), and may be developed as a half-drop, using up to four colors in gouache and showing at least two extra inches all around.

4. Have students select a new documentary reference from their notebook and design a bayadere (horizontal stripe) in 3 colors, using variations within the repeat, which is suitable for summer sportswear. Students are to use a half-drop layout and the most appropriate of these sizes for the vertical repeat: 4", 5", 7½", 8".

5. Have students design an important border for fall women's wear, using up to 4 colors in gouache, from another of their documentary references. Students are to use a 7½" or 8" repeat (affects the border as a side repeat, since the pattern is printed once along the selvedge of the goods) and emphasize negative spaces within the design.

(Note: It is suggested that *at least one* of the documentary-inspired designs be developed as a floral.)

Suggested Evaluation

1. Evidence of the students' ability to demonstrate in a design research notebook, their understanding and application of design research procedures.
2. A student portfolio of a minimum of 5 projects to be evaluated for evidence which demonstrates:
   a. The students' versatility and imagination in adapting and reinterpreting design ideas
   b. Their understanding of historical ornamentation as a valid approach to design
   c. Practicality of designs for end-uses
   d. Design techniques

Teaching Resources

TEXTS AND REFERENCES

Aslin, E. *The Aesthetic Movement, Prelude to Art Nouveau*
Ballinger, L. and T. Vroman. *Design Sources and Resources*
Beer, A. B. *Trade Goods: A Study of Indian Chintz*
Bell, K. M. *Decorative Motifs of Oriental Art*
Boardman, J. *Greek Art*
Bodrogi, T. *Art in Africa.*
Christensen, E. *The Index of American Design*
Downer, M. *The Story of Design*
Janson, H. W. *History of Art*
Munari, B. *Design as Art*
———— *Discovery of the Circle*
Plath, I. *The Decorative Arts of Sweden*
Rice, T. T. *Ancient Arts of Central Asia*
———— *A Concise History of Russian Art*
Rice, D. T. *Islamic Art*
Warren, G. *All Color Book of Art Nouveau*
Wasley, R. *Bead Design*
Weibel, A. C. *Two Thousand Years of Textiles*
Willett, F. *African Art*

PERIODICALS

American Fabrics
Design
Harper's Bazaar
International Textiles
L'Officiel de la Couleur
National Geographic
Realities
Vogue

INSTRUCTIONAL SUPPLIES

- Sample studio layouts and reference pieces, textures, etc.
- Fabric swatches to illustrate the various teaching points covered, e.g. batiks, Indian, Indonesian and other foreign fabrics
- Ribbons, laces, embroideries or any other designed article that illustrate teaching content

PRINT STUDIO TECHNIQUES

Prerequisites: *Textile Design II*

Suggested Hours: 90

Behavioral Objectives

This area of instruction should enable students to:

1. Develop and apply their sense of color through practical experience in color matching.
2. Design different types of croquis.
3. Develop dexterity in making good tracings for studio use.
4. Acquire flexibility in creating color combinations.
5. Know how to put designs into repeat for studio and mill use.
6. Develop the ability to 'match a hand'.
7. Utilize proper methods in adapting designs.
8. Utilize overlays for studio use.
9. Develop dexterity in using various techniques on waxed and unwaxed papers.
10. Design textures by means of various techniques.

Instructional Guidelines

This area of instruction aims to give students an understanding of the techniques used in industry print studios and to develop the specialized competencies essential for entry-level jobs and career advancement in print design occupations.

Projects and exercises in matching colors, designing croquis, making tracings, painting color combinations, and working out repeats provide students with opportunities to apply and refine the knowledge and skills acquired in previous textile design studies. Reference pieces are made whereby students learn to 'match a hand'. Teaching content and learning experiences also include studio techniques for adapting patterns, using overlays and designing textures. Students are taught the importance and use of the tjanting pen for resist work with dyes.

Projects should be explained by the instructor much as a stylist or studio head would require them for a specific market or particular purpose. It is suggested that all work be discussed with instructors and completed only after their approval. Certain projects will require color roughs or layout sketches. The student should present at least two idea roughs for every design, one of which is to be chosen for completion.

Experimentation should be encouraged in techniques and in the development of students' artistic capabilities.

Teaching Modules

I. Color Matching Technique
II. Considerations in Designing Croquis
III. Tracings
IV. Techniques for Colorings
V. Utilization of Croquis for Repeats
VI. Techniques for Reference Pieces
VII. Adaptation of Patterns
VIII. Overlays (Prepared Acetates)
IX. Tjanting Pen Technique
X. Printed Texture Techniques

I. COLOR MATCHING TECHNIQUE

Teaching Content

A. Importance of a Perfect Match

B. "Cut-out Window" Technique
   1. Advantages
   2. Procedures

Learning Experiences

1. Have students bring in five different colored fabric swatches or trims such as piping, ribbon and the like, cut them in half (length of each cut section should be about 3"), and put one group of the cut halves aside. Direct students to match each of their five colors as closely as they can by using gouache and then paint a 3" square of each color. Have students mount all five matching squares with their corresponding colors on a sheet of white paper.
2. Have each student then exchange the cut halves of their five color swatches with a fellow student

in order to match and mount the fabric colors that each receives. Have the class compare and evaluate results, and discuss the industry uses and needs for perfect color matches.

II. CONSIDERATIONS IN DESIGNING CROQUIS

Teaching Content

A. Uses of Croquis
   1. Experimentation for new design ideas
   2. Suggestions for new design ideas
   3. Presentation to studio customers
   4. Possible utilization for repeats

B. Factors Affecting Size of Croquis
   1. Size of motif
   2. Complexity of design idea

Learning Experiences

1. Have students design two different croquis of a small, tailored goemetric pattern appropriate for men's ties or ladies' blouses, using four colors and painting in gouache.
2. Have students design two different croquis of a small floral pattern suitable for lingerie, blouses or children's wear, using dyes and India ink on white paper. Students are to use five colors on a white background.

III. TRACINGS

Teaching Content

A. Guidelines for Making Tracings
   1. Margin around sheet to prevent tearing
   2. Sharp pencil (not too soft)
   3. Accuracy
   4. Register marks to ensure precision
   5. Backed tracing to transfer original position of motifs to fresh paper
   6. Second sheet over original tracing while burnishing to prevent warping of paper.

B. Tracings for Dark Grounds
   1. Use of white or light powder versus use of pencil
   2. Use of light or white carbon paper

C. Use of Frosted Acetate for Tracings
   1. For fine detailed patterns
   2. For darker hard to distinguish patterns

D. Methods of Eliminating Tracings
   1. Office duplicating machine
   2. Waxed rice paper
   3. Use of light table

Learning Experiences

1. Have students make a tracing of one of the tailored pattern croquis painted in Module II and back it, rubbing tracing twice on to georgian paper.
2. Have students make a tracing of one of the two floral designs painted in Module II, back the tracing and transfer it twice on to bristol paper (dull finish).

IV. TECHNIQUES FOR COLORINGS

Teaching Content

A. Considerations in Colorings
   1. Element of designs
   2. Fashion trends in colors
   3. Season
   4. End use
   5. Saleability
   6. Revitalization of past patterns

B. Techniques for Changing Colors
   1. Changes in background color
   2. Changes within the pattern
   3. Addition of rollers
   4. Elimination of rollers
   5. Others

Learning Experiences

1. Using the tracing layouts prepared in Module III:
   a. Have students paint the tailored geometric pattern in gouache
      1) Using a monotone or analogous feeling
      2) Weighing in different colors to the original croquis
   b. Have students paint two color combinations of the small floral pattern in dyes.
      1) Weighing in different colors to the original
      2) Creating a pastel feeling using either monotone or analogous shades
2. Using either colored paper or painting their own background, have students choose any one of the patterns that they prepared in Module III and transfer the tracing by means of Johnson's White Powder. Direct students to paint a new color version of the pattern, suitable for either the fall, holiday, or spring season, and identify their season.
3. Assign students to "shop" one or more major retail stores and report on the colors in apparel that are being featured by the stores. Have class discuss current fashion trends in colors and their implications for textile designers.

V. UTILIZATION OF CROQUIS FOR REPEATS

Teaching Content

A. Advantage
   1. Original 'hand' of the croquis
   2. Incorporation of original into engraving copy

B. Alternative Possibilities
   1. Use a complete croquis
   2. Partial elimination of croquis design

C. Method of Cutting-out a Croquis
   1. Working out croquis repeat on tracing paper
   2. Rubbing down of tracing
   3. Simultaneous cutting of croquis and good paper
      a. Insertion within its shape
      b. Removal of excess paper
   4. Taping of croquis shape to back of good paper
   5. Painting

Learning Experiences

1. Using either a geometric or tailored pattern developed in Module II, have students work out a repeat layout on tracing paper. Discuss and check for balance and accuracy.
2. Have students back the tracing and transfer to georgian or bristol paper for completion. The original croquis is to be used as part of the repeat and inserted into the good paper after the tracing has been transferred.
3. Have students paint in gouache or dyes, like the original.

VI. TECHNIQUES FOR REFERENCE PIECES

Teaching Content

A. Purpose of Reference Pieces
   1. Customer copies for salesmen's use
   2. Pattern record for mill use
   3. Inventory record for studio use

B. Method of Matching a Hand
   1. Analysis and identification of technique
   2. Experimentation for duplication
   3. Tracing
   4. Matching of colors
   5. Painting

Learning Experiences

1. Have students choose one of the painted studio croquis or fabric swatches at their disposal and make a 6" x 8" (approximate) tracing of it, emphasizing the important aspects of the design. Have students match colors perfectly and paint, stressing similarity of technique, and mount both fabric and reference piece together on white paper.
2. Have students repeat procedure with new swatches, if necessary, until competency has been established, choosing a different technique from that studied in project above (e.g. a tight hand versus a free hand, etc.).

VII. ADAPTATION OF PATTERNS

Teaching Content

A. Reasons for Adaptations
   1. Variations of past design successes
   2. Elimination of controversy with competitors over 'Knockoffs'
   3. Avoidance of exact copies

B. Technique of Designing Adaptations
   1. Analysis of original design
      a. Major features
      b. Design idea
      c. Relationship of forms
   2. Maintenance of similar relationship of forms
   3. Possibilities for adaptation
      a. Change of forms
      b. Change of colors
      c. Change of scale

Learning Experiences

1. Have students choose one of the fabric swatches at their disposal and develop an adaptation of the design, using the same number of rollers and the same colors.
2. Using the same fabric swatch and its new interpretation, have students re-design it by adding or eliminating a roller, changing the colors, enlarging or reducing the scale.
3. Have students repeat projects, with variations, until competency has been established.
4. Have class choose the most original and successful adaptations for mounting on white paper, together with the original designs.

VIII. OVERLAYS (PREPARED ACETATES)

Teaching Content

A. Facts Concerning Acetates
   1. Non-Crawl or Colorflex in color essential
   2. Used to best advantage for gouache and pen and ink work

B. Use of Overlays in Studio Work
   1. For experimentation
   2. For greater color choice in showing color combinations

Learning Experiences

1. Using one of the colorings painted in Module IV, have students cover it with a piece of acetate and change its colors with gouache.
2. Have students design a small croquis (6" x 8") inspired by Persian or Indian reference, using black ink and a Rapidograph pen on white bristol paper (dull finish).
3. Have students cover the design with acetate and paint in a two-color version, using the black roller as an outline.
4. Direct students to remove the first acetate, cover design with another piece, and paint in another version, using a different color feeling and four rollers (plus the black). Have students clip or tape the edges of both acetates to the pen and ink original so that the acetates move freely for easy viewing. Discuss variations and possibilities.

IX. TJANTING PEN TECHNIQUE

Teaching Content

A. Explanation of Tjanting Pen
   1. What it is
      a. Design tool
      b. Melted wax is medium
      c. Origin: Indonesia
   2. Utilization
      a. To resist color and design areas
      b. To create resist technique on waxed paper

B. Materials Needed
   1. Tjanting pen
   2. Paraffin or beeswax
   3. Melted wax in a double boiler
   4. Small electric burner
   5. Waxed rice paper, unwaxed Troya paper, Masa paper and certain fabrics, e.g. china silk, cotton
   6. Manila newsprint pad, clean brown paper
   7. Newspapers

C. Alternative Techniques

Learning Experiences

1. Demonstrate tjanting pen technique as follows:
   a. Melt beeswax and paraffin together in equal proportions in a double boiler.
   b. Place tjanting pen in the melted wax and lift out, using a small piece of cardboard to prevent wax from escaping from pen opening.
   c. Bring pen to the surface of the waxed paper, remove cardboard and start to draw. The faster the pen is moved, the finer the line; the slower the movement, the wider the line.
   d. Continue this procedure until all areas to be resisted are covered.
   e. When wax has cooled, areas may be painted with dyes. Resisted areas may be cleared of wax by ironing the waxed paper between two sheets of manila newsprint pad, using newspapers as a cushion. Continue to iron, changing position and paper until it appears free of wax.
   f. Continue to paint and resist according to plan.
2. Have students design a croquis (approximately 6" x 9") using an abstract pattern layout suitable for sportswear. Have students use up to five colors, utilize trap effects and execute in dyes on waxed paper, using the tjanting pen technique for color and design variations. Have students paint a color combination for project #2, weighing in five different colors to the original, using the same tjanting pen procedure as before and mount together with the original.
3. Have students design a floral pattern suitable for women's wear on white or tracing paper, paint a light ground (beige, yellow, light blue, for instance) on the waxed paper and place over the design. Direct students to use the tjanting pen to draw in the outline and paint in the design, trapping colors with the background. When finished, students are to wax entire paper, later removing it by ironing between sheets of manila newsprint paper until wax has disappeared. (Original background color will appear as outline) Have students paint design using an analogous color scheme and up to six colors.
4. Have students paint a color combination for project #3, changing the background and adjusting the colors to a different color scheme. Direct students to maintain color relationships and mount together with the original.
5. Continue projects until competency has been established.

X. PRINTED TEXTURE TECHNIQUES

Teaching Content

A. Texture Design
   1. What it is
   2. Why it is used
      a. To create added interest
      b. To support a design feeling (e.g. documentary)

B. How to Achieve a Texture
   1. Using a gimmick
   2. Using techniques

C. Advantages and Disadvantages

D. Application of Texture
   1. Relation to original design
   2. Dominance of original design

E. Reasons for Texturing
   1. Addition of interest to pattern
   2. Simulation of woven cloth (e.g. linen or flax)
   3. Addition of interest to apparel
   4. Unique and personal means of design expression

F. Examples of Techniques
   1. Crayon plus dye, on bristol paper
   2. Liqui-Tex Gesso (plus dye, if desired) spread on to dull bristol paper and textured
   3. Rubber cement in applicator bottle for resist work on bristol paper
   4. Sobo or Elmer's glue (70%) plus dye (30%) on bristol paper, using a small cardboard or match cover or pallette knife to shape design.
   5. Rubber cement in applicator bottle for outline effects, wash on background, lift off rubber cement, proceed with Sobo or Elmer's glue and dye in applicator bottle.
   6. Drawing with India ink using an eyedropper.

Learning Experiences

1. Demonstrate a batik design as follows:
   Paint design on Troya paper (fine Oriental paper) using dyes. Let dry. Wax entire surface using paraffin wax for a coarser line effect (a combination of beeswax and paraffin will give a fine batik effect). Crinkle areas of waxed paper, then fold. Brush color across open areas with a wad of saturated Kleenex. Let dry, then iron out.
2. Demonstrate a batik effect as follows:
   Take a sheet of georgian paper, wet and wrinkle, then dry and iron. Proceed to paint as usual, using dyes.
3. Using their textile design notebook reference and any other documentary research available, have students design a pattern suitable for menswear, using as inspiration any period of historic design. Direct students to use up to five colors, and stress originality and wearability. Have students transfer to good paper and interpret, using one of the techniques suggested above and mount.
4. Using up to four colors, have students reinterpret the same design layout by changing techniques and mount.
5. Using the applicator bottle and gesso/dye technique, have students design a free floral in up to five colors and mount.
6. Have students reinterpret project #3 above on a colored background, using the crayon/dye technique in up to five colors and mount.
7. Continue projects until competency and flexibility have been established.

Suggested Evaluation

Evaluation may be based on the student's ability to:
1. Match color to given swatches as is done in industrial studios.
2. Design different types of croquis.
3. Make good tracings for studio use.
4. Develop color combinations on existing patterns.
5. Put designs into repeat for studio and mill use.
6. 'Match a hand'.
7. Differentiate between the adaptation and the adoption of a design.
8. Utilize overlays and develop dexterity in using various techniques on waxed and unwaxed papers.
9. Use texture in design as an added interest to certain patterns.

Teaching Resources

TEXTS AND REFERENCES

Anderson, D. *Elements of Design*
Bing, S. *Artistic America, Tiffany Glass and Art Nouveau*
Dhanapala, D. B. *Buddhist Paintings from Shrines and Temples in Ceylon*
Editors of American Fabrics Magazine. *Encyclopedia of Textiles*
Johnston, M. P. and G. Kaufman. *Design on Fabrics*
Keller, I. *Batik: The Art and Craft*
Robinson, S. *A History of Printed Textiles*
Rowland, B. *The Ajanta Caves*
Sloane, P. *Color: Basic Principles and New Directions*
Vanderbilt, G. *Gloria Vanderbilt Book of Collage*

PERIODICALS

American Fabrics
Elegance
Elle
Harper's Bazaar
Vogue
Women's Wear Daily

INSTRUCTIONAL SUPPLIES

- Beeswax, paraffin, a double boiler, a hot plate
- Eyedropper, and an applicator bottle
- Fabric swatches illustrating the various teaching points covered, e.g. the tjanting pen technique, the visual effect of transparent colors 'trapping,' textures of all types, etc.
- Sample studio layouts, reference pieces, textures, etc. painted both in gouache and with dyes on waxed rice paper and other assorted unwaxed papers
- Rapidograph and other type pens
- Tjanting pens with varying spouts

SCREEN PRINTING I

Prerequisites: *Textile Design II; Color and Design; Drawing and Nature Study II*

Suggested Hours: 60

Behavioral Objectives

This area of instruction should enable the students to:

1. Understand the equipment and supplies in a screen-print room and know the proper basic procedures in their use.
2. Make a workable screen starting with a frame covering material, staples, and tape.
3. Know the various kinds of blocked-out screens, their preparation and their uses.
4. Prepare acetates for photographic-emulsion screens.
5. Make a screen with photographic emulsion.
6. Design, make the screens for, and print a two-screen design in repeat.
7. Understand the curing of pigment-printed fabrics.
8. Make a blotch-printed fabric.
9. Make "textural" screens.
10. Design and print a half-drop repeat.

Instructional Guidelines

This area of instruction teaches the students to transform their design ideas into, ultimately, a printed fabric. The adjustment of their designs to the limitations of screen printing will teach them technical resourcefulness and a comprehension of the possibilities and demands of the medium.

Students learn to direct their aesthetic sense to the end use of the textile and to think in terms of the design's suitability to the fabric, the best colors for its printing and the development of a rhythmic continuous pattern for a specific purpose. Emphasis is placed on the importance of color and the student is shown that the screen is an excellent tool for trial and experiment in color.

Lecture-discussions and demonstrations should provide information as quickly as possible and be kept to the shortest practical time to allow for maximum laboratory learning experiences during which the students will make and print screens with colors they have mixed themselves, learning, by actual performance, the means of producing printed fabrics of quality.

Student notebooks on lecture information and scrapbooks containing design ideas, clipped from periodicals, brochures and the like, will be kept and will prove invaluable for future reference.

Teaching Modules

I. Introduction to Print Room Equipment
II. Screen Stretching
III. Blocked-Out Screen Types
IV. Preparing Acetates for Photographic Emulsion Screens
V. Photographic Emulsion Screens
VI. Printing a Two-Way Screen Pattern
VII. Curing Pigment Printed Fabrics
VIII. The Blotch Print
IX. Textural Screens
X. The Half-Drop Repeat Screen

I. INTRODUCTION TO PRINT ROOM EQUIPMENT

Teaching Content

A. The Print Table
   1. Construction and covering
   2. Print rail and rail stops
   3. Jig[1]
   4. Rail spacer

B. Screens
   1. Screen brands[2]

[1] A large T-square-shape crossbar consisting of a 4" wide x 3/4" thick wood strip, the width of the print table with an 18" long horizontal base of the same 3" wood attached to one end with movable tape tabs to correspond with marks made on left edge of screen can be substituted for the jig. It is inexpensive but requires considerable care and patience in its use.

[2] The small screen (outside measurements 24" square) used in schools are necessary, because students cannot handle and print singly the customary 40" to 50" long selvedge-to-selvedge screens generally used in industry. Too, the storage of the latter in the number required by the class would present a serious problem.

2. Coverings (dacron, organdy or silk)
3. Staples (1/4" leg driven in by handgun)
4. Taping (3" wide adhesive)
5. Hot angle iron (4" wide on one side)
6. Screen coatings
   a. Lacquer and other blockouts
   b. Photographic emulsion

C. The Squeegee

D. Dark or Coating Room for Photographic Screens
1. Coating table
2. Drying racks
3. Fans
4. Scraper

E. The Light Table
1. Boards
2. Weights
3. Felt pads

F. The Color Laboratory
1. Counters and sinks
2. Storage shelves and cabinets
3. Electric homogenizers
4. Stainless steel containers and measurers
5. Metric scales
6. Photographic emulsion
7. Photographic sensitizer
8. Colors (pigments, dyes, etc.)
9. Gum and thickeners
10. Chemical reagents

G. The Wash-Out Room
1. Trough
2. Hose
3. Proper washing techniques with hose

H. Drying Racks for Screens

I. Screen Storage Racks

J. The Worktable

K. Pigment-curing Electric Mangle

L. Safety Rules
1. Correct screen storage
2. Keeping aisles and print tables clear
3. Inflammable solvents and poisonous reagents
4. Electric curing mangle

Learning Experiences

1. Demonstrate how to print a screen and how to use basic equipment, materials and facilities of the print rooms as follows:
   a. Mix a small amount of pigment color with polymer vehicle (20% print concentrate plus 80% water) in proportion (color lab or area).
   b. Select a screen from the "library" of previously made screens.
   c. Pin a length of fabric slightly larger than the screen onto the print table using pins at 3" intervals.
   d. Place screen on the fabric.
   e. Pour pigment along far edge of the screen.
   f. Place rubber edge of squeegee behind the pigment.
   g. Draw squeegee with gentle, firm pressure across the screen toward you, return it to original position using the same pressure.
   h. With the squeegee resting inside the screen, raise screen up from one side and lift away.
   i. Wash screen and squeegee thoroughly. Dry and store on correct shelves.
2. Using a previously prepared screen, have students print it several times on paper, using a medium-intensity pigment, clean equipment, and store correctly.

II. SCREEN STRETCHING

Teaching Content

A. Procedures in Stretching Screens

B. Characteristics of Screen
1. Dacron, silk or organdy (dacron suggested for school use)
2. Absolute tightness of dacron
   a. Insures clean print
   b. Insures proper register
3. Importance of careful stapling
4. Importance of neat taping

Learning Experiences

1. Demonstrate characteristics of screens.
2. Have students choose a screen frame and stretch dacron tightly over it, first tacking down three corners, drawing absolutely taut between these points, then filling in staples at 1" intervals. Direct students to staple the remaining two sides at the same intervals, using maximum tension to insure tightness, tape with 3" white adhesive the four sides of screen, allowing 1¾" to extend over dacron, the remainder being neatly and tightly pressed on frame, and make mitered corners, pressing down tightly.

III. BLOCKED-OUT SCREEN TYPES

Teaching Content

A. Types of Blocked-Out Screens
1. Tusche-and-glue screen
2. Red lacquer screen

3. Wax and resist caustic screen
4. Tape-blockout screen
5. Cut lacquer film screen

B. Methods of Making Block-Out Screens

C. Considerations for Each Type
1. Ease of making
2. Time and effort
3. Possible effects
4. Precluded effects
5. Comparative costs
6. End uses in industry

Learning Experiences

1. Demonstrate each type of blocked-out screen as follows:
   a. Tusche-and-glue screen
      1) Paint a simple large 'blocky' motif with liquid tusche on face of screen and allow to dry.
      2) With a heavy cardboard scraper, coat face of screen with thin glue solution and allow to dry.
      3) Give a second glue coat to screen and allow to dry.
      4) Scrub out tusch areas with cloth soaked in benzine and allow to dry.
      5) Print the screen with pigment.
      6) Clean screen and squeegee with benzine.
   b. The red-lacquer screen
      1) Draw a bold simple design on the face of screen with soft lead pencil.
      2) Fill in all areas other than the motif with thin red lacquer and allow to dry.
      3) On a light table examine screen for pin holes and gaps, touch in with lacquer, and dry.
      4) Print with pigment on cloth.
      5) Clean screen and squeegee with cold water.
   c. The wax-and-caustic resist screen
      1) With a soft camel hair brush, paint a design on dacron face of screen, using cold synthetic wax and allow to dry.
      2) Place screen, face down, on coating rack.
      3) Pour a line of caustic resist along upper edge of inside screen surface and thaw across surface in a thin coating, using a metal scraper.
      4) When dry, wash with hot water, using high pressure from both sides of screen until the waxed areas have fallen away and allow to dry.
      5) Print with pigment on cloth.
      6) Clean screen and squeegee with water.
   d. The tape blockout
      1) Using varying widths and shapes of cut adhesive tape, place on face of screen and press on firmly using the thumb nail to press edges firmly on the screen covering.
      2) Print with pigment on white cotton.
      3) Clean screen and squeegee with water.
   e. The cut lacquer film screen
      1) Tape a square of lacquer film, shiny or lacquer side up, over a large simple motif and with sharp mat knife or X-acto blade, score the film following the outline; all cuts must join and the backing paper must not be cut through.
      2) The film within the outline is peeled away, exposing the white backing paper.
      3) Lay a clean screen, face down, over film, with the glossy side up, and adhere by wetting a small area at a time with lacquer thinner soaked cotton cloth and rub this area firmly until dacron darkens, showing that the film has adhered.
      4) Turn screen over and peel off paper backing.
      5) Fill in edges with red lacquer, touch out any pin holes and allow to dry.
2. Have students write briefly the directions for making each type of screen.
3. Have students make a checklist of the advantages and limitations of each method.
4. Using any one of the methods demonstrated, have students make and print a small screen.

IV. PREPARING ACETATES FOR PHOTOGRAPHIC EMULSION SCREENS

Teaching Content

A. Drawing the Repeat

B. Color Separation for Two Acetates

Learning Experiences

1. Demonstrate procedures for drawing the repeat:
   a. Develop a two-screen repeat design (two colors plus overprint).
   b. Place register marks at corners.
2. Demonstrate separation of colors for two acetates as follows:
   a. Paint a separate frosted acetate for each color, being sure to include overprint areas, with opaque medium.
   b. Draw register marks on each acetate, making certain they match exactly.
3. Have students make two acetates, using a geometric motif for a 15" repeat; try for 80% coverage and

provide for overprints; place registration marks correctly.

V. PHOTOGRAPHIC EMULSION SCREENS

Teaching Content

A. Preparation of Screens

B. Exposure of Screens

Learning Experiences

1. Demonstrate preparation of screens as follows:
   a. Wash face of screens with household bleach to clean, rinse throughly and allow to dry.
   b. Place acetate on print table beside a jig and six inches from print rail.
   c. Place the two register marks at the same distance from the jig, by pinning down the top one, measuring the distance to the center of the top register mark, then placing the lower one to the same distance (the jig lever is against a rail stop to prevent its moving).
   d. Place screen face down on acetate, its angle iron extended over jig crossbar, fit a railstop on crossbar and tighten it well.
   e. Center the screen over the design laterally, but allow about 3" or more at the top which will serve as a color "well"; fasten stop on print rail well.
   f. Trace register marks on the dacron with sharp, soft lead pencil, using a straight edge, and making each mark about 1½" long.
   g. Repeat above with second screen.
   h. Mix photographic emulsion (one ounce sensitizer solution to five ounces emulsion in a small container).
   i. In the dark room lay the screens flat, face up, and coat by drawing the emulsion across the the screen with metal scraper (a thin even coating is desirable here). Repeat process with second screen.
   j. Store screens, face up, in racks below coating table before fans, close doors to prevent exposure to light.
   k. Allow to dry, approximately 25 minutes.
2. Demonstrate procedures in exposing the screen as follows:
   a. Tape one of the acetates on glass of the light table.
   b. Bring a screen from the dark room and quickly place it, face down, over acetate, aligning register marks exactly.
   c. Place, first, a foam rubber mat or felt pad on the dacron, then a piece of plywood, both the size of the inside of the screen on the dacron.
   d. Distribute several five-pound weights over the plywood, being careful not to move the screen.
   e. Turn on lights and exposure for correct time (usually 1-2 minutes).
   f. Turn off lights, remove weights, board, and pad from screen and rush to wash room.
   g. Gently wash face of screen with cold water, concentrating on the pattern until those parts wash out.
   h. Dry screen before fans.
   i. Repeat above, using the second acetate and the other screen.
   j. On light table, touch up any pin holes with emulsion on face of screens.
3. Have students make two photographic emulsion screens using acetates prepared in preceding module.

VI. PRINTING A TWO-WAY SCREEN PATTERN

Teaching Content

A. Placement of Rail Stops on Print Rail

B. Attachment of Iron to Screen

C. Use of Stops on Jig

D. Mixture of Pigment Colors

E. Preparation of Table and Fabric for Printing

F. Printing of Fabric

Learning Experiences

1. Demonstrate procedures of printing a two-screen pattern as follows:
   a. Placement of rail stops on print rail
      1) Measure width of repeat on screen.
      2) Set this distance on the rail-spacer.
      3) Using rail-spacer, place rail stops at correct intervals along print rail and tighten.
      4) Secure by turning the rail stops down firmly and then giving each a half turn with pliers.
   b. Attaching iron to screen, fasten 4" angle iron with two 5/8" screws, five inches below upper left corner of screen, one of its sides extending beyond the screen frame.
   c. Using the stops on jig
      1) Measure the height of repeat of design.
      2) Set first stop on jig to allow screen to print to selvedge.

3) Using rail-spacer, set rail stops on jigs for height of design.
4) To print across fabric width, place the upper edge of the extending angle iron tightly against the rail stops on the jig, keep the left edge tight against edge of jig.
5) To print, laterally lift lever of jig and roll jig to proper print rail stop, lower lever on right side of stop.
6) Place angle iron on screen snugly against the proper rail stop on the jig.

d. Mixing pigment colors
1) Use enough previously prepared polymer "vehicle" (mixed 1/3 polymer print concentrate to 2/3 water) in a print container, slowly adding and stirring in pigment color (1/10-1/4) until desired shade is attained.
2) Test color on fabric swatch and allow to dry.
3) Add more vehicle to lighten, or more pigment to darken color until desired intensity is reached.

e. Preparing the table and fabric for printing
1) Brush table thoroughly for pins, paper, etc.
2) Check that there is space for jig to move along fabric.
3) Place fabric to be printed on table 4" from nearest print rail, pin ends, drawing fabric tight, with T-pins at 4" intervals, pin sides the same way.

f. Printing the fabric
1) Using the jig and rail stops, print fabric in alternate spaces to allow time for color to dry before coming back to fill in open spaces.
2) Set down and lift screen carefully to avoid smudging.
3) Be sure jig lever is tight against right side of rail stops in printing length of fabric.
4) Be sure angle iron is snug against front of rail stops on jig in printing across width.
5) Print with two even strokes of squeegee, printing alternate spaces first then filling in blanks.
6) Carefully wipe edges of screen with cloth to remove any wet color that may have been picked up before the screen is set down in its next position.

2. Using the two screens prepared in Module IV, have students print two yards of white cotton broadcloth with pigments in analogous colors.

VII. CURING PIGMENT PRINTED FABRICS

Teaching Content

A. The Electric Mangle

B. Procedures

Learning Experiences

1. Demonstrate and explain procedures for using the electric mangle.
a. Set thermostat and preheat mangle at 300° Fahrenheit for twenty minutes for cotton.
b. Pin corners of one end of printed cotton length on padded roll of mangle.
c. Raise front board to horizontal position thus bringing the cylinder in contact with the heated iron surface of the "shoe".
d. Immediately start motor to rotate cylinder. Fabric will be rolled onto cylinder.
e. Allow iron to turn for fifteen minutes for two-yard length of fabric.
f. Lower front board, turn off motor and heat. Remove fabric and pins.
g. The heat has bonded the resin in the color mixture to the cotton, making it fast for washing and cleaning.
2. Have students cure the length of cotton which they printed in Module V.

VIII. THE BLOTCH PRINT

Teaching Content

A. Purposes of Blotch Print
1. Colored background for design
2. Design created by shaped openings in the blotch

B. Procedures

Learning Experiences

1. Demonstrate blotch print procedures.
2. Have students:
a. Draw a simple bold one-color floral (15" square repeat) making sure motifs touch, or are not more than an inch apart.
b. Paint spaces between motifs (and line detail within them) on acetate with opaque medium; where necessary make short joins on opposite edges.
c. Make a screen photographically from this acetate following directions given in Module IV.

IX. TEXTURE SCREENS

Teaching Content

A. Purpose
   1. For photographic emulsion screens
   2. Alternative to drawn and painted patterns

B. Linoleum Blocks as a Textural Motif

C. Rubbings of Textured Surfaces
   1. Shells
   2. Caning rough wood
   3. Others

D. Examples of "Accidental" Effects
   1. Spatter
   2. Dropped string
   3. Confetti
   4. Sponging
   5. Others

Learning Experiences

1. Demonstrate textural screens.
2. Have students:
   a. Cut a stylized symmetrical design on a 4" by 4" linoleum block, using a simple subject from nature (fish, flower, butterfly, etc.) and texture background deeply.
   b. Make several prints on thinnest rice paper and arrange these on clear acetate in a 15" repeat, taping the prints down with scotch tape.
   c. "Shoot" a photographic screen from this as if it were on opaque print acetate. (exposure time, less than one minute)
   d. Wash out very gently with cold water and dry.
   e. Print in suitable color on fabric (see Module V).

X. THE HALF-DROP REPEAT SCREEN

Teaching Content

A. Examples

B. Advantages

C. Differences

D. Procedures

Learning Experiences

1. Demonstrate half-drop repeat screens as follows:
   a. Show several examples of half-drop repeat, pointing out advantages in variety of layout.
   b. Note difference from the block side-by-side previously used.
   c. Show a one-color 15" pattern in half-drop, using abstract floral motifs.
   d. Show acetate with opaque medium.
   e. Make a photographic screen from the above acetate.
   f. Set stops on jig and print rail, and print, dropping every second row of repeats, 7½".
2. Have students design and print in two colors a simple half-drop fabric, using pigment color.

Suggested Evaluation

1. Evaluate notebooks and scrapbooks for a comprehension of screen printing and an awareness of the design possibilities available everywhere.
2. Have students do an outline for a printing project which identifies end use and includes a rough of design and color swatches and evaluate for:
   a. Understanding of technical aspects
   b. Use of color
   c. Composition and continuity of design
   d. Originality of concept
   e. Neatness of execution
3. Evaluation of original fabrics developed in learning experiences to be based on use of color, originality of concept, technical proficiency, design composition and neatness of execution.

Teaching Resources

TEXTS AND REFERENCES

Johnson M. and G. Kaufman. *Design on Fabrics*
Lanterburg, L. *Fabric Printing*
Schwalbach M. and J. Schwalbach. *Screen Process Printing for the Serigrapher and Textile Designer*

INSTRUCTIONAL SUPPLIES

- Silk screens
- Screen printed sample fabrics
- Samples of design roughs
- Acetates
- End-product examples of different types of silk screens
- Fabrics for screen printing

WOVEN DESIGN I

Prerequisites: *Basic Textiles; Color and Design*

Suggested Hours: 60

Behavioral Objectives

This area of instruction should enable students to:

1. Understand how cloth is woven and the equipment on which it is done.
2. Understand and use the most basic terminology of weaving.
3. Know how to calculate the number of ends and the length of a warp.
4. Be able to wind warps.
5. Dress a hand loom (by the back to front method)
6. Weave samples of cloth.
7. Recognize and use the basic 4 harness weaves and their derivatives.
8. Tie a new warp onto a "dummy" warp.
9. Know the various classifications of stripes.
10. Understand how the use of color in weaving differs basically from other applications.

Instructional Guidelines

In this area of instruction students are introduced to weaving by means of the 4 harness hand- or foot-operated loom. Whether table or floor model, it is identical in principle to all other shaft or harness looms no matter how driven or what size, and most of the weaving which will be done on it is exactly like cloths done on any other loom.

On this equipment the student will execute two projects--the central learning experiences of this area. It is suggested that project #1 be a black and white warp, about 6" x 8" in width (roughly 1/3 black, 1/3 white, 1/3 a stripe of the student's plan). The sett is 15 ends per inch or less depending upon the size of the yarn available. The larger the yarn, the easier to discern the weaves and relate them to the drafting. The same yarn is used for filling in all but one of the samples. On this warp the basic weaves and their variations are assigned to be woven in 2" or 3" lengths; solid white, solid black, pick and pick, etc. Once techniques have been mastered, students are encouraged to experiment and try out their own ideas.

The second project, a solid color warp tied directly onto the end of the first, applies basic principles of color theory to weaving. By redrawing half of the warp it demonstrates how another type of Drawing-In will change the character of the weaves with which the student is already familiar. Students should be given considerable freedom to exercise choice of pattern and weaves on this warp.

Combined lecture-demonstrations should be planned by the instructor in order to enable students to observe the various processes just prior to executing them themselves.

Teaching Modules

I. Introduction and Orientation
II. Loom Parts and Their Function
III. Planning and Making a Warp
IV. Dressing the Loom: Back to Front
V. Weaving: The Plain Weave and Its Derivatives
VI. The Twill Weaves and Their Derivatives
VII. Finishing the Sample
VIII. Changing Part of the Draw: Designing Filling Stripes
IX. Using Color in Weaving

I. INTRODUCTION AND ORIENTATION

Teaching Content

A. Overview of Weaving
   1. Beginnings: basketry, twining, etc.
   2. Hand-production of cloth from Roman times to Industrial Revolution
   3. Modern textile mills

B. Terms Related to the Weaving Process
   1. Warp-end
   2. Filling
   3. Pick
   4. Shuttle

5. Shed
6. Balanced weave

Learning Experiences

1. Illustrate weaving terms by a demonstration on the loom.
2. Have students identify and discuss the formation of the fabrics of the clothes that they are wearing and/or from sample swatches of the three basic weaves.
3. Assign students to collect examples (either actual fabrics or good photographs) of woven cloth with varying characteristics, identify and bring into class.

II. LOOM PARTS AND THEIR FUNCTION

Teaching Content

A. Loom Parts: Their Function
   1. Warp beam and apron
   2. Cloth beam and apron
   3. Harnesses and heddles
   4. Ratchets (let-off)
   5. Levers (table loom) or lams and treadles (floor loom)
   6. Beater and reed

B. Table Loom and Floor Loom
   1. Comparison
   2. Types of harness operation
      a. Counterbalanced loom
      b. Jack loom
      c. Countermarch loom
   3. Relationship of handloom to power loom
   4. Role of hand loom in industry

C. Warp Specifications and Related Terms (preparation for project #1)
   1. Cut length
   2. Sett-Reed plan
   3. Warp arrangement
   4. Warp plan (drawing-in draft, entering or threading draft): straight draw

Learning Experiences

1. Distribute project sheet and discuss the warp specifications in it (see Instructional Guidelines).
2. Assign students to their looms and have them familiarize themselves with the various parts and movements.
3. Following the "warp specifications" on their project sheet, have students begin to design their warps to be made at the next class meeting. The arrangement may first be determined by sketching but should then be made into a wrapping done to scale around a piece of cardboard about 1" x 7" using the same yarns as will be used later in the warp.

III. PLANNING AND MAKING A WARP

Teaching Content

A. Selecting Yarns
   1. Strength and smoothness
   2. Non-abrasive qualities

B. Determining Number of Ends per Inch

C. Determining "Cut Length" of a Warp
   1. Woven length
   2. Loom waste
   3. Take-up and shrinkage

D. Warping Process
   1. Reel or board
   2. Warping terms
      a. End
      b. Course
      c. Cross

Learning Experiences

1. Examine and approve students' plans for their warp and then have students proceed to make warps. Have students work in pairs, with one student checking for errors and assisting the other to handle the yarn. Check each warp to see that it is correctly tied at the cross before it is chained off the Warping Board or Reel.
2. Assign students to prepare a page in their notebooks for "Warp Specifications" with the following information:
   a. the Wrapping: to scale and in warp yarns
   b. the Warp arrangement: written out
   c. the Cut length of the warp
   d. the Drawing-in-draft: showing each end in a straight Draw
   e. the size of the reed or sett or number of E/"

IV. DRESSING THE LOOM: BACK TO FRONT

Teaching Content

A. Methods of Loom Dressing
   1. Back to front
   2. Front to back

B. Terms and Equipment
   1. Lease sticks
   2. Raddle
   3. Drawing-in hook
   4. Dents (in the reed)
   5. Sleying the warp

C. Procedures in Dressing Loom Back to Front

Learning Experiences

1. Demonstrate dressing the loom back to front, as follows:

a. Placing lease sticks in cross
b. Placing rod of warp beam apron through loop at top
c. Placing ends in a raddle
d. Adjusting apron rod
e. Smoothing unevenness in the top of the warp
f. Rolling warp onto beam
g. Suspending lease sticks behind harnesses
h. Drawing-in the ends
i. Sleying the warp
j. Tying the warp to the rod of the cloth apron

2. Have students warp their looms, still working in pairs to facilitate the process. (The principle in dressing the loom is to get each end placed smoothly on the back beam in approximately the position the end will have in the woven cloth. It is easier to achieve this if one person is in front of the loom handling the warp, unchaining it, shaking yarns apart, and holding the tension smooth, while an assistant at the back moves the lease sticks forward, turns the crank of the warp beam, places paper around the beam as the warp is going on). Caution students that absolute accuracy is necessary in drawing-in the ends in the heddles, and in sleying the ends in the dents of the reed; that if errors occur in these processes, corrections can be very time consuming.

V. WEAVING: THE PLAIN WEAVE AND ITS DERIVATIVES

Teaching Content

A. Weave Drafting and Terminology
   1. Raiser (or Riser)
   2. Sinker
   3. Symbol
   4. Unit of repeat

B. The Plain Weave: Variations and Relationship to Warp Plan
   1. The 1/1 plain weave
   2. The 2/2 basket weave
   3. Oxford weave

C. The Chain – Harness Motion
   1. How it is determined
   2. How it is written

D. Details of Weaving Procedure
   1. Filling the shuttle
   2. Making the sheds
   3. Beginning and ending a color
   4. Laying in the pick
   5. Beating up the fabric
   6. Moving the warp forward (during weaving)
   7. Establishing smooth and rhythmic weaving motions
   8. Checking filling specifications

Learning Experiences

1. Demonstrate the teaching content of this module.
2. Have students check their looms for accuracy.
3. Have students begin to weave their samples. Encourage them to unweave anything that is not correct or not satisfactory.

VI. THE TWILL WEAVES AND THEIR DERIVATIVES

Teaching Content

A. The Twill Weaves
   1. The 2/2 twill: right or left hand
   2. The 3/1 warp face twill
   3. The 1/3 filling face twill
   4. Reverse or zig-zag twills
   5. Crowsfoot or broken twills

B. Relationship to the Warp Plan

C. Finding the Chains for Each Weave

D. Filling Specifications and Related Terms
   1. Weave draft (2 x 2 Repeat)
   2. Chain
   3. Filling arrangement
   4. Number of picks per inch
   5. Swatches of filling yarns

Learning Experiences

1. Besides sampling all the weaves, have students achieve the following:
   a. A true "Plaid" (for one balanced cloth)
   b. A "Reversible" (for one unbalanced cloth)
   c. Three or four weaves, or combination of weaves, of the student's design to be executed at the end of the warps in order to test his/her own ideas and understanding of the woven structure.
2. Assign students to prepare pages in their notebooks on "Filling Specifications," in which they will record each weave as discussed in this module.

VII. FINISHING THE SAMPLE

Teaching Content

A. The Role of Finishing in Textile Production
   1. Burling and mending
   2. Washing
   3. Tentering

4. Pressing
5. Shrinking

B. Finishing Sample Warps
1. Finishing top and bottom
   a. Decorative braiding or knotting
   b. Machine stitching and trimming
2. Mending broken ends and threads
3. Trimming loose threads
4. Steam pressing

C. Preparation for Project #2
1. The "Dummy" warp
2. Warp specifications
   a. Cut length
   b. Sett-Reed plan
   c. Warp arrangement
   d. Warp plan: straight and even point

Learning Experiences

1. Have students complete first project, cutting it off at breast beam, leaving enough "dressed" warp on loom.
2. Assign finished first project and related documents to be brought to class for evaluation.
3. Distribute project sheet and discuss the warp specifications in it (see Instructional Guidelines).
4. Have students proceed with the new project by:
   a. Selecting yarn and color
   b. Making warps and placing lease sticks in cross
   c. Securing lease sticks to breast beam
   d. Cutting top of warp
   e. Tying new warp to old one
   f. Easing knots through reed and heddles
   g. Beaming the warp
   h. Tying down
5. Assign students to prepare draft of even-point for that section of warp to be redrawn.

VIII. CHANGING PART OF THE DRAW: DESIGNING FILLING STRIPES

Teaching Content

A. Redrawing Part of the Warp
1. Placing lease sticks in plain weave sheds
2. Removing ends to be redrawn from heddles
3. Re-entering ends in new sequence
4. Re-sleying and tying-down

B. Striping Systems
1. Classical: Roman
2. Striae: fine random
3. Ombre
4. Composite
5. Pin or chalk
6. Outline
7. Random: unbalanced

C. Creating Filling Stripes
1. Using more than one color
2. Varying the beat
3. Using more than one weave
4. Using different size yarns
5. Using different textured yarns

Learning Experiences

1. Assign students to do the following:
   a. Make a series of 7 wrappings (maximum 2" long) to document the various stripes.
   b. Using two large yarns of equal size and contrasting color, wrap them so that no more than three strands of either color are next to each other in all but the classical (Roman) and random stripes.
2. Have students continue to get warps onto the looms, placing 1/2 of the new ends in the even-point draw, and start weaving when ready.

IX. USING COLOR IN WEAVING

Teaching Content

A. Color Schemes
1. Monochromatic
2. Complementary
3. Analogous
4. Split-complementary
5. Triad

B. Factors Influencing the Appearance of Color in Weaving
1. Fragmentation: crossing of warp and filling
2. Modification
   a. Highlights and shadows of three-dimensional surface
   b. Absorption or reflection of light by yarns

Learning Experiences

1. Explain and discuss filling specifications and color schemes of Project #2.
2. Have students select colors for their second project. Allow them latitude to exercise choice and to develop awareness of their individual objectives, i.e. harmoniousness, serenity, richness, etc.
3. Have students execute their second warp with a minimum of supervision, using notes from lectures and first weave structure. Records of all weaves, filling arrangements, and yarn swatches are to be kept for notebooks.

4. Assign students to bring in completed project and the documents relating to it, for analysis and critical evaluation.

Suggested Evaluation

Evaluation may be based on student work which evidences:

1. Absence of weaving errors
2. Uniformity of beat
3. Reasonably good edges (selvedge)
4. Meeting of specifications
5. Originality and taste
6. "Professional" appearance of work
7. Neatness, accuracy, and completeness of notebooks

Teaching Resources

TEXTS AND REFERENCES

Blumeneau, L. *The Art and Craft of Handweaving*
Larson, J. L. and A. S. Thorpe. *Elements of Weaving*
Znamierowski, N. *Step-by-Step Weaving*

INSTRUCTIONAL SUPPLIES

- 4-Harness hand-operated looms
- Yarns
- Warping boards
- Small accessory tools
- Fabric swatches of basic weaves

WEFT KNIT DESIGN AND TECHNOLOGY

Prerequisites: *Basic Textiles; Color and Design*

Suggested Hours: 60

Behavioral Objectives

This area of instruction should enable students to:

1. Distinguish between the different types of knit construction and understand the basics of loop formation.
2. Understand the technical and aesthetic use of color in knitted fabrics.
3. Know how yarn types and sizes affect the weight and hand of knitted fabrics.
4. Be proficient in graphing designs for single knit fabrics.
5. Know the technology, aesthetics and procedures for designing stripes in knitted fabrics.
6. Know the application of pattern areas relating to the respective patterning mechanisms.
7. Identify, design and duplicate fabrics knitted on single knit machines.

Instructional Guidelines

This area of instruction should aim to apply the fundamentals of color and design aesthetics to the technology of fabricating designs for weft knitted materials. The textile design program includes two areas of knit design instruction: (1) the design for single knits, and (2) the design for double knits, in all their inherent variations. This introduction to Weft Knit Design and Technology represents the first of these two areas of instruction.

Since it is virtually impossible, however, to design for knitted fabrics without a fundamental knowledge and understanding of the capabilities and limitations of knitting mechanisms, students who are interested in knitting design should have a basic comprehension of knitting technology as a prerequisite for knit design. Concurrently, as the students familiarize themselves with the technical possibilities and limitations of knitting machines, major emphasis is placed on the creative utilization of the machines' capabilities. Visits to knitting mills should implement this area of instruction, since direct exposure to the technical machinery involved will facilitate the students' comprehension of the knitting process and improve their performance.

Sample swatches of current knit fabrications of all types should be used extensively for learning experiences, in order to help students develop their understanding of machine potentials and become familiar with presently accepted fabrics. It is further recommended that an end-term portfolio of original designs be required of each student, for eventual presentation to potential employers. It will be noted that the areas of instruction deal primarily with weft knitting design. Designing for warp knit structures is more complex and furthermore cannot be taught on relatively inexpensive hand-knitting machines. If a warp knitting machine laboratory is available in the school, teaching modules or an area of instruction in warp knitting design can be added or substituted.

Teaching Modules

I. Introduction to Knitting Design
II. Color in Knitted Fabrics
III. Fabric Quality Factors
IV. Single Knits
V. Stripes
VI. Patterning Mechanisms
VII. Novelty Single Knit Fabrics

I. INTRODUCTION TO KNITTING DESIGN

Teaching Content

A. Definition of Knitting

B. Basic Terminology
   1. Needle loop
   2. Sinker loop
   3. Wales
   4. Courses
   5. Stitches per inch

C. Types of Knitting
   1. Warp
      a. Raschel
      b. Tricot
   2. Weft
      a. Flat bed
      b. Circular
         1) Single
         2) Double
         3) Purl
         4) Sweater-strip machine

D. Basics of Loop Formation
   1. Needles used
      a. Latch
      b. Spring bearded
      c. Compound
   2. Appearance of loop (knit and tuck)
      a. On face
      b. On back
   3. Drawing loop diagrams
      a. Jersey
      b. Rib
      c. Purl (Links-Links)

Learning Experiences

1. Distribute different types of knitted swatches to students and have them analyze the knitting characteristics of each swatch.
2. Have students draw loop diagrams for face and back of single knit fabrics.
3. Take students on one or more field trips to knitting mills.

II. COLOR IN KNITTED FABRICS

Teaching Content

A. Imparting Color into Knitted Fabrics
   1. Yarn dyeing before knitting
   2. Piece dyeing after knitting
   3. Combination of the above two

B. Color Limitations for Knitted Fabrics
   1. Using yarn dye
   2. Using piece dye

C. Aesthetic Use of Minimal Colors

D. Color Distortion Created by Knitting Construction and How to Use It to Advantage

E. Creation of Shading Effects (3 Colors from 2 Colors)

F. Color As a Weight Factor

G. Planning of Seasonal Color Lines
   1. Fall
   2. Holiday
   3. Spring

H. Painting and Graphing Design Ideas for Knitted Fabrics in Color
   1. Economic factors relating to color
   2. Economic factors relating to fiber choice

Learning Experiences:

1. Assign students to plan a color line for a specific season and end use, and visually present their "line" by means of color samples (e.g. colored yarns, swatches, clippings, etc.)
2. Have students choose (a) two colors, and (b) three colors, and use them for multi-color effects, evaluating their aesthetic possibilities.
3. Have students research and present suitable novelty yarns for textural effects in knitting.
4. Distribute a swatch of woven fabric and have students try to duplicate it, using the same number of colors.

III. FABRIC QUALITY FACTORS

Teaching Content

A. Yield

B. Wales and Courses per Inch
   1. How to calculate, given the machine gauge
   2. Relation to pattern size

C. Yarns Used
   1. Spun
      a. Cotton
      b. Worsted
      c. Woolen
   2. Filament
      a. Straight
      b. Textured
   3. Ply yarns

D. Yarn Size and Numbering System
   1. Cotton
   2. Worsted
   3. Woolen
   4. Filament
   5. Conversion factors
   6. Relation of yarn size to cut of machine.

E. Other Factors in Yarn Quality
   1. Twist
   2. Uniformity
   3. Strength
   4. Elasticity
   5. Number of ends plied

Learning Experiences

1. Distribute samples of different types of yarns and have students distinguish between them.
2. Distribute swatches of the same knitted construction, each of which has different yarn sizes and have students identify the sizes.
3. Have students make yarn count conversions relating to specific machine gauges.
4. Have students choose their own fiber type and count for the construction of a garment of their choice, including the machine specifications suitable for its manufacture.

IV. SINGLE KNITS

Teaching Content

A. Technical Terminology
   1. Needles
   2. Sinkers
   3. Knit stitches
   4. Tuck stitches
   5. Miss or welt stitches
   6. Feed units

B. Accordion Fabrics: Rules and Applications
   1. Straight
   2. Alternate
   3. Selective accordion

C. Basic Single Knit Constructions
   1. Jersey
   2. Knit and tuck
   3. Knit and welt
   4. Laying in
   5. Plaiting
   6. Pulled needles

D. Needle Selection on Knitting Machines
   1. High and low butt
   2. Long and short
   3. Multiple selection

Learning Experiences

1. Distribute four sample swatches of fabrics and have students identify the construction of each.
2. Have students design and graph fabrics of constructions similiar to the above for two-needle selection patterning, and suggest suitable yarn size and machine gauge for each.
3. Have students design and graph fabrics of the above constructions for multiple needle selection patterning, and suggest suitable yarn size and machine gauge for their construction.

V. STRIPES

Teaching Content

A. Designing Feed (or Fixed) Stripes
   1. Limitation of height or size of stripe
   2. Limitations of number of colors versus machine feeds
   3. Aesthetic evaluation

B. Inspiration for Stripe Designs
   1. Pictorial
   2. Ribbons
   3. Textures

C. Automatic Striping Machines
   1. Striping drums
   2. Striping fingers
   3. Chain arrangement
   4. Tuck bar (pattern placer)

D. Repeat Limitations and Possibilities on Automatic Machines
   1. Garment length repeats
   2. Repeat length variations on knit and welt construction
   3. Repeat length variations on knit and tuck construction

E. Evaluating Stripes
   1. By repeat
   2. By size arrangements
   3. By color arrangements

F. Using Industrial Striping Charts for Programming of Automatic Stripes
   1. With striping chain only
   2. With pattern placer (tuck-bar) and striping chain
   3. With wheels, chain and pattern placer

Learning Experiences:

1. Distribute sample swatches of fabrics produced on automatic and fixed stripe machines and have students identify them accordingly.
2. Have students create stripe designs for fixed stripes and automatic stripes, and identify the end products for which their designs would be appropriate.
3. Have students program their stripe designs for the machine.
4. Have students draw (or trace) an end product for which their stripe designs are appropriate, and draw their stripes on it.

VI. PATTERNING MECHANISMS

Teaching Content

A. Calculating Pattern Areas
   1. Relating number of feed units to height of graph
   2. Relating number of wales to width of design
   3. Relating drawing graphs to actual size, taking into consideration pattern areas and machine gauge.

B. Raceway Machines
   1. Four raceway fixed cams
   2. Eight raceway fixed cams

C. Multiple Selection Machines (mini-jacks)
   1. Twelve-step
   2. Twenty-four step
   3. More than twenty-four step

D. Pattern Wheels
   1. Straight
   2. Alternating
   3. "L" shaped
   4. Argyle

Learning Experiences:

1. Have students design several knit fabrics which demonstrate the students' understanding of pattern areas relating to different types of mechanisms.
2. Have students evaluate knitted swatches and determine their suitability for the various patterning mechanisms learned.
3. Have students modify distributed swatches and adjust them to be suitable to knit on two or more different patterning mechanisms.

VII. NOVELTY SINGLE KNIT FABRICS

Teaching Content

A. Eyelets
   1. Drop-stitch
   2. Plaited lace
   3. Transfer eyelet

B. Loop Fabrics
   1. Plain terry
   2. Jacquard terry

C. Inlay Fabrics
   1. With elastic yarn
   2. Napped or brushed

Learning Experiences:

1. Distribute swatches of lace and terry designs for student analysis, identification and discussion.
2. Have students create a given number of their own lace and terry designs.

Suggested Evaluation

1. Evaluation may be based on an end-term portfolio of the students' own designs which demonstrates:
   a. Technical correctness
   b. Originality of design
   c. Neatness in presentation of portfolio
   d. Ability to identify the correct machines suitable for knitting their designs
2. Students may be evaluated on their ability to correctly graph out a given number of assigned designs.

Teaching Resources

TEXTS AND REFERENCES

Abrams, A. and L. Mishcon. *Pattern Wheel Designing for Circular Jersey Knitting Machines.*

Dubied Knitting Manual.

Reichman, C. *Knitting Dictionary*

– – – – *Knitting Encyclopedia*

– – – – *Knitted Fabric*

– – – – *Principles of Knitting Outerwear*

– – – – *Fabrics and Garments*

PERIODICALS

American Fabrics
Daily News Record
Knitting Times
Modern Textiles

INSTRUCTIONAL SUPPLIES

- Flat bed hand knitting machines
- Sample swatches of different types of knitted fabrics
- Samples watches of piece dyed, cross dyed and yarn dyed fabrics
- Samples of different types of yarn
- Sample swatches of knitted fabrics with different yarn sizes
- Sample swatches of single knit fabrics, fabrics produced on automatic and fixed stripe machines, rib fabrics, jacquard mechanism fabrics, purl knits, lace, and terry fabrics
- Graph paper
- Pick-out glasses
- Pick-out needles
- Colored felt-tip pens
- Paint
- Brushes

Career Advancement Instruction

TEXTILE DESIGN III

Prerequisites: *Textile Design II*

Suggested Hours: 120

Behavioral Objectives

This area of instruction should enable the student to:

1. Develop professional judgment in the selection and presentation of work according to industry standards.
2. Acquire speed and dexterity in designing for specific markets, using various techniques.
3. Understand the requisites needed for designing for the home furnishings field, specifically draperies and wallcoverings.
4. Know how to design for sheets and pillowcases.
5. Know how to design for towels and shower curtains.

Instructional Guidelines

This area offers the student the opportunity of reviewing and perfecting those techniques and skills learned in previous Textile Design studies and of adapting them to designing for a new range of products in the home furnishings field, such as draperies, wallcoverings, sheets, pillowcases, towels, shower curtains, and the like.

Industry standards and professional methods of work should be stressed, and two important areas should be emphasized: (1) the presentation of work and (2) meeting deadlines. The proper presentation of work should be discussed and demonstrated as an important part of a designer's professionalism. Previous projects are reviewed and remounted where necessary.

This area of study concentrates on giving students the means of rising above the first level capacity as designer and progressing to knowledgeable self-confidence in their work. A series of "Quickies" introduce the time element within the working experience. These projects, usually completed within three hours, enable the student to function independently while designing for suggested markets. This method sharpens skill competency and critical judgment. There should be no criticism during these "Quickie" sessions. The objective here is to promote self-reliance and freedom of choice. Students learn to develop their own designs independently and to organize their time in doing so. Upon completion of the projects, however, the instructor will join students in a group discussion of all the designs. The best of these will either be mounted or worked upon for further development.

Designing for home furnishings represents an important part of this area of study. Discussions regarding the decorating field and its possibilities should be followed by pertinent technological information governing the creative area, such as repeat sizes for the various products and the printing processes used in their production.

It is important to remember that sizes and methods of printing in the home furnishings area vary from converter to converter, depending on the price range, the type of pattern and its eventual place in a line (whether commercial or custom). This also applies to jacquard construction weaving for towels, where different technical limitations would apply. The sizes and methods of production listed in the teaching content are basic, and relate exclusively to the print area. Since a design can easily be translated into any specified measurement quite easily, these specifications can be considered guidelines for students to help them design for different products. The stress here is on the flexibility of textile design and of the importance of design itself as a selling point.

Several projects are suggested for each area, some with color combinations. The instructor is free to modify and limit these to suit his or her own particular situation. Since competence is the main objective, much will depend on the general and particular performance of students.

The policy of requesting three color roughs for each project is left to the discretion of the instructor. A color rough for any design is advisable, since studios work on the premise that patterns must be

sold (accepted) before being developed. This area of study encourages experimentation and inventiveness, and the student develops under the guidance of the instructor.

Teaching Modules

I. Proper Presentation of Work
II. "Quickies"
III. Draperies and Wallcoverings
IV. Sheets and Pillowcases
V. Printed Towels and Shower Curtains

I. PROPER PRESENTATION OF WORK

Teaching Content

A. Size
   1. Full scale (unless otherwise noted)
   2. Variations in layout measurements

B. Large Patterns
   1. Re-inforcement at edges
   2. Rolled

C. Information for Inclusion
   1. Color scale
   2. Repeat information
   3. Name of artist
   4. Title of design (if any)

D. Consistency in Presentation

E. Mounting
   1. Color combinations on separate sheets or acetate overlays
   2. Space at bottom

F. Neatness

G. Quantity
   1. Meaningful
   2. Brief

Learning Experiences

Choosing any project or projects from a previous area of study, have students re-mount, applying teaching points discussed.

II. "QUICKIES"

Teaching Content

A. Reasons for "Quickies"
   1. Time element in industry
   2. Sharpens skill competency
   3. Develops critical judgment

B. Examples of "Quickies"
   1. Documentary inspired
   2. Florals
   3. Others

Learning Experiences

(All designs are to be in croquis form except, eventually, bayaderes or stripes which would automatically have to be in repeat, depending on the size.)

1. Using research books or notebook reference, have students choose historic material and design a pattern suitable for women's wear in one or two colors and in any medium.
2. Using the same historic reference, have students design a variation of the same pattern suitable for men's wear, in one to three colors and in a different medium from the preceding one, as well as with a different layout.
3. Have students design a sophisticated Liberty floral suitable for women's wear, using dyes, pen and ink technique, and from one to five colors. Students then design a floral suitable for sportswear, using any technique and up to three colors.
4. Have students develop a bold design suitable for men's wear using any technique or inspiration in one to four colors.

III. DRAPERIES AND WALLCOVERINGS

Teaching Content

A. Purpose and Physical Function

B. Decorative Function
   1. Addition of interest
   2. Addition of color
   3. Creation of mood
   4. Distraction from architectural flaws

C. Comparison to Designs for Apparel
   1. Media
      a. Gouache mostly
      b. Dyes occasionally
   2. One or non-directional
   3. Larger color areas
   4. Larger motifs
   5. Importance of color themes

D. Types of Designs
   1. Documentary
   2. Nature
      a. Floral
      b. Leaves
      c. Scenic
   3. Modern Geometric
      a. Abstract
      b. Semi-abstract

4. Conversational
5. Panels

E. Types of Design Styles
1. Naturalistic
2. Stylized
3. Formal
4. Informal
5. Random
6. Set

F. Avoidance or Modification of Controversial Subjects
1. Religious objects
2. Insects
3. Birds
4. Objects with unpleasant connotations

G. Possibilities of Wallcovering/Drapery Relationships
1. Coordinated designs
2. Companion designs
3. Design related to solid color

H. Customary Repeat Sizes
1. Draperies
   a. Width of goods: 45", 48", 50", 54"
   b. Vertical repeats: 22", 24", 27"
   c. Others
2. Wallcoverings
   a. Widths: 27"
   b. Vertical repeats: 18", 27"
   c. Others

I. Printing Process Widths
1. Machine roller prints: 36" and 48"
2. Rotary screen prints: 52" and 54"
3. Others

J. Considerations for Repeats
1. Seaming problems
2. Need for perfect joining at edges

Learning Experiences

1. Have students design a pattern for drapery with a geometric theme, using up to five colors. The design will be in repeat and show approximately four extra inches all around.
2. Have students design a modern floral for chintz to be screen printed, using 6 to 8 colors on a medium or light background. Possible repeat: 18" x 18", 27" x 27" half-drop or square.
3. Using references at their disposal, have students design a pattern for drapery with a documentary theme, using up to five colors. Have students stress originality and practicality, using a textured effect if they wish. Possible repeat: 27" x 27" or any fraction thereof.
4. Have students design a wallpaper pattern to coordinate with drapery project #3 above. This design will relate to it in some way (color and form), emphasizing or using part of it, but not overpowering the drapery. Students may el...nate some colors.

IV. SHEETS AND PILLOWCASES

Teaching Content

A. Physical Function

B. Decorative Function
1. Accent areas
2. Environmental complements

C. Repeat Sizes
1. Width: any fraction of 120"
2. Length: any fraction of 36"
3. Pillowcase: 21" x 36" (including 4" side hem)
4. Other variations

D. Printing Processes
1. Machine roller
2. Rotary screen
3. Others

E. Design Considerations
1. Practicality
2. Inventiveness
3. Re-interpretation of traditional designs
4. Current trends in design
5. Freshness of techniques

F. Design Possibilities
1. Borders
   a. Solid with design border
   b. Design with solid border
2. All-over
3. Stripes
4. Engineered prints

Learning Experiences

1. Assign students to shop one or more major stores and report on the type of designs being featured in sheets and pillowcases. Have class discuss current and dominant trends in design.
2. Have students design a coordinated sheet and pillowcase as follows:
   a. A dramatic patterr for sheets which is applicable to various areas through color changes (e.g. a man's room or a girl's room). Students are to use dyes or gouache in one to four colors.
   b. A pillowcase in the same colors, coordinated to the sheet using the 21" to 36" printing space to best advantage. Students may design for the

entire 42" x 36" area or divide, as preferred, keeping in mind that the seam represents the bottom of the case.

c. Paint up two color combinations for both sheet and pillowcase to complement their pattern presentation and mount the combinations on separate sheets.

3. Have students:
   a. Design a floral pattern for sheets emphasizing an original layout and personal interpretation, using up to five colors and concentrating on an engineered print for the 28" "fold" section of the sheet.
   b. Coordinate their idea with a design for the bottom sheet, eliminating some colors if they so wish.
   c. Working with original layout idea, plan a pillowcase for the above pattern using the same colors.
   d. Mount designs.
4. Have students:
   a. Design a sheet suitable for teen-agers (or children) using contemporary idea trends and up to four colors.
   b. Coordinate an all-over pattern for use as the bottom sheet. They may eliminate one of the colors, if desired. Have students paint, using the same medium as the original.
   c. Design a pillowcase for the pattern, using the same colors.
   d. Mount designs.

V. PRINTED TOWELS AND SHOWER CURTAINS

Teaching Content

A. Towels
   1. Decorative function
      a. Color accents
      b. Creation of mood
   2. Customary sizes for repeats
      a. Bath or beach sheet: 44" x 72"
      b. Bath: 27" x 50"
      c. Hand: 16" x 30"
      d. Guest: 11" x 18"
      e. Washcloth: 13" x 13"
      f. Other variations
   3. Rotary printing method
   4. Design considerations
      a. Suitability for folded towels
      b. Engineered or all-over design

B. Shower Curtains
   1. Decorative function
      a. Decorative accents
      b. Coordinated to towels
   2. Customary sizes for repeats
      a. Width: 36" or any fraction thereof
      b. Length: 18" or any fraction thereof
      c. Variations
   3. Methods of printing
      a. Machine roller
      b. Rotary screen
      c. Others
   4. Types of materials
      a. Plastics
      b. Fabrics
      c. Others

Learning Experiences

1. Have students design a floral pattern for towels, using four colors. Direct students to predominate one color and stress an original layout.
2. Have students design a shower curtain pattern to coordinate with the towel above, using the same colors and any layout they feel to be appropriate.
3. Using documentary reference, have students design an important border for towels, using up to four colors. The design is to be in repeat. Students then design a coordinated shower curtain to be used with the above towels, using the same colors and improvising on a related, but different layout.
4. Have students design an original beach sheet, using one color on a white or colored background for a dramatic effect. Their theme is to be a free choice of any appropriate inspiration.

Suggested Evaluation

Evaluation may be based on evidence of the student's ability to:

1. Demonstrate critical judgment in the selection and presentation of work according to industry standards.
2. Complete *at least 18 projects* successfully (including color combinations and design coordinates) using various techniques and adhering strictly to pre-determined time schedules.
3. Develop coordinated designs for draperies and wallcoverings, adhering to the technical limitations which affect these patterns.
4. Develop a given number of coordinated designs for sheets and pillowcases.
5. Develop a given number of coordinated designs for towels and shower curtains.

Teaching Resources

TEXTS AND REFERENCE

Aslin, E. *The Aesthetic Movement: Prelude to Art Nouveau*
Cheskin, L. *Colors: What They Can Do for You*
Crewdson, F. *Color in Decoration and Design*
Halse, A. *The Use of Colors in Interiors*
Kampmann, L. *Creating with Printing Material*
Luckiesh, M. *Color and Colors*
McClellan, N. *Historic Wallpapers*
Pettit, F. *America's Printed and Painted Fabrics, 1600-1900*
Sargent, W. *The Enjoyment and Use of Color*
Weeks, J. *Rugs and Carpets of Europe and the Western World*
Whiton, S. *Elements of Interior Design and Decoration*

PERIODICALS

American Fabrics
Domus
Graphis
House Beautiful
Home Furnishings Daily
House and Garden
Interiors
Vogue

INSTRUCTIONAL SUPPLIES

- Samples of studio drapery and wallpaper designs
- Samples of drapery fabrics and wallcoverings
- Sample books of draperies and wallpapers
- Samples of designed sheets, pillowcases, towels, shower curtains
- Retail advertisements and catalogues

CURRENT TRENDS AND INDUSTRIAL PRACTICES

Prerequisites: *Textile Design III*

Suggested Hours: 45

Behavioral Objectives

This area of instruction should enable students to:

1. Understand the function of the textile industry in the business of fashion.
2. Know the structure and industrial practices of the textile industry.
3. Recognize the importance of fashion in textiles and the sources of information available for fashion planning and projections.
4. Differentiate between possible places of employment for textile design occupations and understand the advantages and limitations of each.
5. Understand the procedures for getting a job.

Instructional Guidelines

This area of instruction is designed to help textile design students relate their special field of interest and educational preparation to the industrial practices and career opportunities in the textile industry. It also aims to deepen the students' understanding of the relationship of the textile field to the fashion industry complex and to the fashion process.

Although the objectives of this instructional area concentrate on the development of knowledge and understanding rather than on the development of specific design skills, it is recommended that class lecture time be kept to a minimum. Community resources should be utilized to the fullest for on-site visitations and guest speakers, and emphasis should be placed on "minds-on" learning experiences.

Teaching Modules

I. Fashion Industry Overview
II. The Textile Industry
III. Importance of Fashion for Textiles
IV. Careers in Textile Design

I. FASHION INDUSTRY OVERVIEW

Teaching Content

A. Fashion Industry Enterprises and Their Function
   1. Primary markets: foreign and domestic
      a. Textiles
      b. Non-textiles: leathers, furs, plastics
   2. Secondary markets: foreign and domestic apparel and accessory producers
      a. Men's
      b. Women's
      c. Children's
   3. Retailers
      a. Department stores
      b. Specialty stores: large and small
      c. Chain store organizations
      d. Discount stores
      e. Mail-order houses
      f. Direct sellers: house-to-house
   4. Auxiliary enterprises
      a. Advertising agencies
      b. Publicity agencies
      c. Fashion publications: trade and consumer
      d. Consultants: fashion, display, marketing
      e. Trade associations: fashion groups, textile producers, textile distributors, color associations, apparel producers, etc.
      f. Independent design studios: apparel, textiles, etc.

B. Dominant Role of Consumers
   1. Determination of fashions by consumers
      a. Industry proposes styles and designs: apparel and textiles
      b. Acceptance by customers determines the fashions
      c. Different fashions for different groups: socio-economic and geographic differences
   2. Buying motivation and behavior

Learning Experiences

1. Assign students to survey and report on the different types of business enterprises in the community that are involved in the business of fashion.
2. Have student groups develop a flow chart of fashion industry activities beginning with the clothes that they themselves are wearing and working backwards through the retailers to the producers of their garments, the producers of the textiles, and the suppliers of natural or man-made fibers.
3. In small group discussions, have students analyze why they have bought (or have made) what they are wearing. Have students classify their reasons as emotional or rational buying motives, come to conclusions on the major reasons for buying fashion products, and suggest the implications of their buying motives for designers of fashion products.
4. In order to emphasize the dominant role of the consumer in the fashion industry, explore students' opinions about their freedom of choice to buy or not, their many alternative product choices, and the excess of supply over demand.

II. THE TEXTILE INDUSTRY

Teaching Content

A. History and Development
   1. First mill in 1793
   2. Rapid growth in 19th century
   3. Movement of mills from North to South
   4. Entry of man-made fibers
   5. Vertical integration in 20th century
   6. Current economic importance
      a. Number of mills
      b. Number of people employed
      c. Value of output
      d. Geographic location

B. Types of Enterprises and Major Activities
   1. Enterprises: types, function, and relationships
      a. Mills
      b. Converters
      c. Dyeing, finishing and printing plants
      d. Sales offices
      e. Independent textile design studios
   2. Classification of activities
      a. Design
      b. Production
      c. Marketing

C. Customers of the Textile Industry
   1. Apparel and accessory producers
   2. Retail piece goods departments
   3. Others

D. Characteristics of the Textile Industry
   1. Publicly-owned giant textile firms
   2. Specialized operations
      a. Within vertically-integrated firms
      b. Independent firms
   3. Emphasis on brand-name fibers and advertising
   4. The converting function
   5. Design piracy
   6. Use of independent design studios
   7. Work flow

E. Review of Textile Design and Production Terminology

Learning Experiences

1. If community resources permit, plan a behind-the-scenes field trip to a textile firm. Arrange for a representative of the firm to explain and show the firm's activities relating to design, production, and marketing.
2. Assign students, either working individually or in groups, to research the history and development of the textile industry in the U.S. for a class presentation of their findings. Assign different periods to different students to prevent excessive duplication.
3. Distribute the company brochures of J.P. Stevens Co. and/or Burlington Industries to students and have them discuss the organization and divisions of a vertically-integrated giant textile enterprise.
4. Distribute a pre-prepared list of textile design and production terminology to students and have them classify its contents according to (a) design processes and techniques, and (b) production processes. Then assign students to add terminology that they may have acquired in their previous textile design studies. The following terminology may be given to the students as a "starter":

(1) converter
(2) gimmick
(3) mill engraving
(4) grin
(5) flock patterns
(6) sketch
(7) pantograph
(8) photographic engraving
(9) overprint
(10) grey goods
(11) trap or fall-on
(12) batik
(13) end use
(14) warp printing
(15) blotch printing
(16) copper roller
(17) vertical set-up
(18) crocking
(19) embossing
(20) knock-off
(21) bread and butter pattern
(22) calendering
(23) flushing
(24) half-etch
(25) independent studio
(26) resist printing
(27) discharge printing
(28) doctor blade
(29) adaptation
(30) free-lance
(31) block printing

(32) 'weighing in'
(33) printing
(34) screen printing
(35) jig
(36) strike-off
(37) direct printing
(38) end or warp
(39) filling or pick
(40) top beam designs
(41) clip spots
(42) ground dobby
(43) wales
(44) courses
(45) jacquard loom

III. IMPORTANCE OF FASHION FOR TEXTILES

Teaching Content

A. The Dynamics of Fashion
   1. Terminology
      a. Fashion
      b. Style
      c. Design
      d. Fad
      e. Trend
   2. How fashions change
      a. Evolutionary nature of fashion change
      b. Fashion cycles
   3. Influencing factors
      a. New technical developments
      b. Important current events and personalities
      c. Life styles
      d. Demographic and psychographic trends

B. Impact of Fashion on Textile Industry
   1. Demand for variety and change
   2. Early fashion planning in yarns and fabrics
   3. Importance of design
   4. Use of fashion as a selling tool
   5. Fashion personnel specialists
      a. Fashion coordinators
      b. Stylists

C. How Fashion Expresses Itself in Textiles
   1. Colors
   2. Textures and textured effects
   3. Motifs, themes, patterns

D. Projecting Fashions
   1. Fashion research: sources of information
      a. Trade periodicals
      b. Fashion reporting services
      c. Trade association reports
      d. Fashion and fabric magazines
      e. Retail stores
      f. News items: important events and personalities
      g. Demographic and psychographic studies
      h. "People-watching"
   2. Analysis and evaluation of research information
      a. Appropriateness for firm's customers
      b. Analysis of common denominators
      c. Application of fashion principles: evolutionary nature of fashion changes
      d. Order of importance
      e. Element of risk
      f. Element of costs
   3. Interpretation and application
      a. Designs
      b. Testing procedures

Learning Experiences

1. Assign students to bring into class examples of current fashions as illustrated in magazines or newspapers. Have class discuss these fashions as they reflect, relate, and are influenced by life-styles, technical developments, events and personalities in the news, and/or demographic and psychographic trends.
2. Assign students to visit local museums and/or research historical fashion books in order to study and compare the home-produced textile designs of (a) the early American settlers and (b) past and present primitive cultures, with the design elements of contemporary fabrics. Have students summarize and report their findings in a visual presentation, and come to conclusions on the differences in modern textile designing and their implications for textile designers.
3. Have students research sources of fashion information, as discussed in class, and write a report of 400-500 words on their projection of fashions for the coming season in terms of color trends, types of patterns, and textures. Have students identify their sources of information and implement their reasoning and projections with fabric swatches and sample croquis of their predicted styles.

IV. CAREERS IN TEXTILE DESIGN

Teaching Content

A. Possible Places of Employment
   1. Independent design studios
      a. Advantages
      b. Limitations
   2. Independent converters
      a. Advantages
      b. Limitations
   3. Design studios in vertically integrated firms
      a. Advantages
      b. Limitations
   4. Printing plants
      a. Advantages
      b. Limitations
   5. Free-lancing

a. Advantages
b. Limitations

B. Types of Jobs and Responsibilities
1. Entry jobs
2. Career advancement

C. Getting a Job
1. Qualifications
a. Attitudes
b. Abilities
2. Sources of information about jobs
a. School placement services
b. Help-wanted advertisements
c. Employment agencies
3. Applying for a job
a. Resumes: personal data, education and training, work experience
b. Portfolios

Learning Experiences

1. Invite as a guest speaker (or, if possible, a panel of speakers) a stylist, studio head, or textile designer to discuss with the students the career opportunities in textile design in terms of possible places of employment, entry jobs, career advancement, and qualifications. Ask the guest speaker(s) to implement their discussion with samples from their current line.
2. Have students write a short report on the type of textile design position they would prefer and for which they believe they are qualified, and give reasons for their choice.
3. Have students, using their portfolios, role-play job interviews for textile design jobs. The role of the employers may be played by the instructor and/or other students. Have class evaluate interviews and make suggestions for improvement.
4. Have each student write a help-wanted advertisement for a specific textile design occupation which includes job responsibilities and desired qualifications. Have students exchange advertisements and explain their interest and qualifications for the advertised job.

Suggested Evaluation

Evaluation may be based on evidence of the student's ability to:

1. Identify and distinguish between the different types of enterprises in the textile industry.
2. Define or briefly explain a given list of textile design and industry terminology.
3. Demonstrate their understanding of the relationship of textile design to fashion.
4. Identify the sources of information available for fashion research and the factors to be considered in evaluating information researched.
5. Cite the advantages and limitations of design jobs in two different types of industrial set-ups.

Teaching Resources

TEXTS AND REFERENCES

Barnhardt, R. *Opportunities in the Textile Industry*
Birren, F. *Selling Color to People*
Cone, S. *Aim for a Job in the Textile Industry*
English, W. *The Textile Industry*
Fried, E. *Is the Fashion Business Your Business*
Potter, N. *What Is a Designer.*

PERIODICALS

American Fabircs
California Men's Stylist
Clothes Magazine
Daily News Record
Elegance
Fashion magazines: *Harpers, Vogue,* etc.
Women's Wear Daily

INSTRUCTIONAL SUPPLIES

- Company brochures of Burlington Industries, 1345 Avenue of Americas, New York, N.Y. 10036 and J.P. Stevens & Co., 1185 Avenue of Americas, New York, N.Y. 10018
- Swatches of current fabric fashions
- *Fabric Term Dictionary,* Dan River Mills Inc., 111 West 40th Street, New York, N.Y. 10018

ADVANCED PRINT DESIGN

Prerequisites: *Print Studio Techniques*

Suggested Hours: 60

Behavioral Objectives

This area of instruction should enable students to:

1. Evaluate their technical capabilities and develop their competencies in those areas which they consider weak.
2. Design different types of patterns, using various inspirational sources, which reflect industry standards and organization of time.
3. Develop their own personal sense of design and color by 'styling a line' for a specific fashion market, and adapting industry methods in the presentation of work.

Instructional Guidelines

This area of instruction offers advanced students the opportunity of developing and perfecting those skills and techniques which will enable them to handle the more responsible studio jobs, such as color stylist, designer, stylist, etc.

The learning experiences encourage the student to work independently, under the guidance of the instructor. Each of the three main projects will be discussed with the instructor, but will eventually be developed by the students themselves. It is suggested that a time limit be given for the completion of each project. This method will enable the young designers to assume full responsibility for their work, and will further develop their sense of organization and timing.

The number of projects should be flexible, since much will depend on the speed and versatility of the students. At the outset, their portfolio of finished designs should be evaluated and discussed by both the instructor and student. Where necessary, a number of practice sessions are suggested to help them strengthen weak areas, e.g. florals, colorings, flexibility of hand. The students may prefer to re-interpret one of their own designs, which they feel they could improve, or they may elect to develop a new one. The project which results from these practice sessions should later be evaluated.

Experimental designing is stressed, whereby students use inspirational sources of their own choosing and develop original layouts and design concepts suitable for specific markets. They may use any technique and work independently within the technological limitations they have learned. Here, again, the amount of work produced depends on their inventiveness and technical ability. Three projects are suggested, but instructors may modify the number according to their discretion and the needs of the students. Finally, the students learn to develop their own 'line,' a series of variations on a design theme of their own, developed for a specific season and market.

It is important to point out to the student that timeliness, practicality and projection are necessary considerations in styling a line. This first experience, limited to a few suggested types of patterns, exposes the student to the actual responsibility of developing a fashion concept from idea to finished layout. The croquis involved do not have to be large, but should be sufficient to show the patterns to advantage. All designs should be mounted, and presentation which meets industry standards should be stressed. Color combinations may be included for a more complete showing.

Teaching Modules

I. Self-Evaluation
II. Inspirational Sources for Experimental Designing
III. Styling a 'Line'

I. SELF-EVALUATION

Teaching Content

A. Student Appraisal of "Weak Areas"
   1. Florals
   2. Colorings
   3. Flexibility of hand
   4. Techniques
   5. Others

Learning Experiences

1. Have students define their own design areas that need strengthening and then produce any pattern, coloring, or technique which will test and improve their performance, discussing results with the instructor and developing their exercises into a finished design suitable for a specific market, for example, printed wovens, menswear, home furnishings, etc.
2. Continue projects where necessary, until competency has been established.

II. INSPIRATIONAL SOURCES FOR EXPERIMENTAL DESIGNING

Teaching Content

A. Newspaper Clippings

B. Architectural and Rhythmic Concepts

C. Linear Technique

D. Free Choice

Learning Experiences

Have students choose three of the four suggested areas of inspiration and design croquis suitable for identified specific markets, varying designs through, (1) technique, (2) color feeling, (3) layout. Direct students to use up to five colors for one, three colors for the other, and black and white for a third. Discuss results with students.

III. STYLING A LINE

Teaching Content

A. Explanation of a 'Line'

B. Considerations in Designing a 'Line'
   1. Season
   2. Potential customer market
   3. Production factors
      a. Capabilities
      b. Costs
      c. Processes
   4. Fashion trends
      a. Colors
      b. Textures
      c. Silhouettes and shapes
   5. Anticipated end uses
   6. Design theme
   7. Objectivity

C. Examples of Design Theme Variations
   1. Coordination of different types of designs
      a. Florals
      b. Stripes
      c. Geometrics
      d. Borders
   2. Coordination of key colors
      a. Single colors
      b. Multi-colors
   3. Coordination of pattern relationships

Learning Experiences

Extended and continuing project: Have students identify a specific season and intended customer market and develop a small 'line' of a minimum of five suitable patterns. Patterns are to include:

1. A minimum of one coordinated pattern
2. A dramatic pattern
3. A sophisticated floral
4. A documentary inspired pattern
5. A basic pattern

Direct students to key colors together so that patterns will relate to each other, even though the predominant colors in each may differ. Emphasize originality in both color and design ideas. Discuss problems and procedures with students but allow them to develop their 'line' independently.

Suggested Evaluation

Evaluation may be based on evidence of the student's ability to:

1. Demonstrate versatility and competence in the execution and completion of self-imposed projects.
2. Design different types of patterns, using various media and inspirational sources, which reflect professional attitudes, organization of time, and industry standards.
3. Demonstrate imagination, flexibility and an individual sense of color and design in 'styling a line' of *at least five* different and coordinated patterns for a specific fashion season and market.

Teaching Resources

TEXTS AND REFERENCES

Adhemar, J. *Twentieth Century Graphics*
Bodrogi, T. *Art in Africa*
Editors of American Fabrics Magazine. *Encyclopedia of Textiles*
Luckiesh, M. *Visual Illusions*
Weibel, A. *Two Thousand Years of Textiles*

PERIODICALS

Ambassador
American Fabrics
Daily News Record

Design
Elegance
Gentlemen's Quarterly
Graphis
Harper's Bazaar
Home Furnishings Daily
House and Garden
Interiors
L'Officiel de la Couleur
Vogue
Women's Wear Daily

INSTRUCTIONAL SUPPLIES

- Beeswax, paraffin, double boiler, hot plate, tjanting pens
- Retail store catalogues
- Fabric swatches of all types for illustration and discussion
- Examples of studio layouts, reference pieces, textures, etc.

ADVANCED SCREEN PRINTING

Prerequisites: *Screen Printing I*

Suggested Hours: 90

Behavioral Objectives

This area of instruction should enable students to:

1. Understand dyes and the textiles for which they are suited, the processes of dyeing and curing, the merits and drawbacks of each.
2. Design and print a large repeat decorative cotton fabric, using reactive dyes.
3. Print silk and wool with acid dyes, and finish these prints by steaming.
4. Use resists to make patterned dyed fabric.
5. Use discharge to produce design by removing color from dyed fabric.
6. Employ tie-dye grounds with screen print.
7. Use batik techniques to make grounds for printing.
8. Correctly print a poster in several colors using one screen and the block-out method.

Instructional Guidelines

This advanced area of instruction continues the students' training in printing with emphasis on dyes and the means for producing new effects with discharge and resists. The printing of decorative panels or posters on paper or cardboard, as a further use of screen printing, is the final project in this area of study.

Lectures and demonstrations should supply information on different dye systems, the fabrics to which they are best suited, and the necessary curing methods. Students will keep notebooks of dye formulas and dyeing procedures for their current and future use. It is recommended that students be required to keep a scrapbook of design ideas gathered from periodicals, brochures and the like, along with swatches of fabrics. It is further recommended that visiting industry experts be invited to demonstrate dyeing and printing methods used in their field.

Teaching Modules

I. Dyes and Their Affinities
II. Decorative Fabrics
III. Printing Silk and Wool with Acid Dyes
IV. Creating Patterns With Resists
V. Use of the Discharge Method
VI. Tie-Dye Backgrounds
VII. Batik Effects
VIII. Pictures, Panels, Posters on Cardboard or Paper

I. DYES AND THEIR AFFINITIES

Teaching Content

A. Dyes for Printing Cellulosic Fibers
   1. Basic dyes
      a. Merits and disadvantages
      b. Formulas and dyeing procedure
      c. Curing procedure
   2. Fiber-reactive dyes
      a. Merits and drawbacks
      b. Formula and dyeing procedure
      c. Curing procedure
   3. Direct dyes
      a. Advantages and drawbacks
      b. Formulas and dyeing procedure
      c. Curing method
   4. Soluble vat dyes (also dye silk)
      a. Advantages and disadvantages
      b. Formula and dyeing procedure
      c. Finishing

B. Dyes for Printing Animal Fibers
   1. Acid dyes
      a. Formula and procedure
      b. Curing
   2. Fiber-reactive dyes
      a. Advantages
      b. Formula, dyeing procedure
      c. Curing

C. Dyes for Printing Synthetic Fibers
   1. Disperse dyes
      a. Formula
      b. Curing

2. Acid dyes (for nylon)
   a. Formula and procedure
   b. Curing

II. DECORATIVE FABRICS

Teaching Content

A. Design Considerations
   1. Size of repeat
   2. Type of coloring
   3. Drawing and composition

B. End-Use Considerations
   1. Function of room
   2. Type of decor
   3. Possibilities of end usage

Learning Experiences

Have students design a two-screen fabric with a repeat size of 24" x 38", with acetates; prepare with opaque medium from design and make two photograph emulsion screens. Mix sufficient reactive dyes and print with the aid of another student; set up print rail stops for these width-of-fabric screens and print five yards of cotton in two-man teams, working one on either side of table. Finally, cure the fabric (heat at 300°).

III. PRINTING SILK AND WOOL WITH ACID DYES

Teaching Content

A. Dye Solutions
   1. Components
   2. Sequence of combining ingredients
   3. Heating solution

B. Finishing Fabric
   1. Steaming
   2. Washing

Learning Experiences

1. Demonstrate printing with acid dyes as follows:
   a. Mix dye solution and discuss:
      1) Components: dyestuff, glycerin, water, thickener (gum tragacanth), tartaric acid
      2) Sequence of combining ingredients
      3) Heating solution to dissolve dyestuff
   b. Discuss steaming and washing to finish fabric.
   c. Steam for one hour in closed box or over metal pot steamer.
   d. Wash in cold then lukewarm water.
2. Have students print a half yard of white silk with acid dyes they have mixed; when dry, steam, wash, finish.

IV. CREATING PATTERNS WITH RESISTS

Teaching Content

A. Characteristics of Resist Method
   1. Determination of pattern by resist shape
   2. Dyeing of entire fabric
   3. Crackle effects
   4. Addition of color to pattern

B. Applications of Resists
   1. Batik
   2. Starch resists
   3. Stencilled resists

C. Tools of Resist Method
   1. Tjanting pen for batik
   2. Sticks and feathers for primitive effects
   3. Punched-out metal stencils

Learning Experiences

1. Demonstrate resist method as follows:
   a. Paint simple design on white cotton using feathers, brushes, wooden blades, etc., with laundry starch. Let dry.
   b. Dip fabric in hot dye.
   c. Crack away starch resist.
   d. Wash fabric.
   e. Using boldly designed screen, "print" cold synthetic wax on white cotton. Print over it with open screen using pigment. Press between newspaper until wax is removed, showing white where wax was "printed."
   f. With a tjanting batik tool or brushes apply paraffin-beeswax in loose freehand design on white or light-colored cotton. When dry, dye with reactive dye. Cure, wash and press.
2. Have students make a fabric using one of the above resists; when dry and cleaned, add more of the same resist to other areas, dye again, clean and finish.

V. USE OF THE DISCHARGE METHOD

Teaching Content

A. Effects of Discharge Method
   1. Uniformity of background color
   2. Production of colorless areas

B. Economic Advantages
   1. Labor saving
   2. Less wastage

C. Discharge Agents
   1. Lemon juice
   2. Commercial agents

Learning Experiences

1. Demonstrate the discharge method as follows:
   a. Dye cotton with direct dyes using a dark shade. Dry.
   b. Screen over it a discharge paste (sodium sulphoxylate, glycerin, gum tragacanth thickener) using any design. Dry. Steam for 5 minutes, then rinse in several baths of lukewarm water.
   c. Print over cotton dyed with potassium permanganate using lemon juice mixed with gum thickener. Dry resulting fabric, rinse in cold water, boil in detergent bath, rinse again.
2. Have students screen print lemon juice discharge paste over potassium permanganate dyed cloth; repeat with paste using approximately one-half the quantity of lemon juice; compare results and notice a light value has been produced on a dark ground.

VI. TIE-DYE BACKGROUNDS

Teaching Content

A. Types of Tie-Dye
   1. Fold dye
   2. Tied-in small objects

B. Pattern Effects
   1. Liberated effects
   2. Ombres
   3. Stripes and plaids
   4. Polka-dots

C. Advantages
   1. Degree of control
   2. Low cost of dye materials
   3. Enhancement of low-cost fabrics
   4. Coordination possibilities to screen-printed motifs

Learning Experiences

1. Demonstrate tie-dyeing a fabric as follows:
   a. Fold dye a yard of cotton in a middle value of brown or blue, using simple two-inch wide pleats.
   b. Print a small-motif screen over the finished fabric, coordinating the print with the ground. Cure with pigment.
   c. Tie up marbles or small pebbles tightly in white cotton at regular intervals in a geometric pattern. Dye fabric. Overprint with a small all-over design.
2. Have students combine the two tie-dye effects above to form a ground for a specific small-detailed screen; when dry, overprint with pigment or reactive dye. Heat cure.

VII. BATIK EFFECTS

Teaching Content

A. Types of Batik Designs
   1. Batik colors
   2. Batik-crackle ground

B. Batik Effects
   1. Color
   2. Texture
   3. Background for silk-screen printing

C. Tools
   1. Batik
      a. Tjanting pens
      b. Brushes
      c. Hot wax
   2. Batik-crackle
      a. Broad simple brushes
      b. Wax

Learning Experiences

1. Demonstrate a batik design as follows:
   a. Using a variety of tjantings and brushes, paint a design in wax on white cotton.
   b. Dye the cotton with cold reactive dye.
   c. Remove wax with benzine bath.
   d. Overprint coordinated screen, using reactive dye in a strong value.
   e. Cure with heat.
2. Demonstrate batik crackle-ground as follows:
   a. Pin out on newspaper a yard of white cotton.
   b. Using a two-inch brush, coat the fabric with hot parafin. Allow to harden.
   c. Unpin the fabric and crumple it with the hands. Flatten out.
   d. Immerse fabric in cold bath of household dye for three minutes.
   e. Dry, scrape off excess wax, wash out residue with benzine.
   f. Pin out fabric and overprint with pigment color.
3. Have students combine the two batik effects demonstrated to produce two yards of dyed and printed fabric.

VIII. PICTURES, PANELS, POSTERS ON CARDBOARD OR PAPER

Teaching Content

A. Considerations in Printing on Cardboard or Paper
   1. Non-absorbency
   2. Need for special drying racks
   3. Exactness of screen registration

4. Composition for a contained area
5. Length of drying time

B. Materials
1. Printing inks with thickeners
2. Pigment fabric colors
3. Hinged screen frames (control of registration)

C. Methods of Obtaining Registry
1. Registration tabs
2. Hinged screen frames

Learning Experiences

1. Demonstrate teaching content as follows:
   a. Show a variety of screen printed panels and posters. Point out the number of colors and probable sequence.
   b. Show a screen frame hinged to drawing board for printing posters.
   c. Point out how registry is obtained.
   d. Show how same screen can be printed several times on a poster, blocking out indicating areas and changing color correctly for each successive print.
2. Have students design and print a three-color poster or panel using printing inks (or pigments) and beginning with one screen to be blocked out in stages.

Suggested Evaluation

1. Evaluate student laboratory projects for:
   a. Understanding and application of teaching content
   b. Improvement of work methods
   c. Aesthetic quality
   d. Evidence of advanced skill
2. Evaluate students' clipping scrapbooks for:
   a. Variety
   b. Utility as design inspiration
   c. Evidence of their imagination

Teaching Resources

TEXTS AND REFERENCES

Johnson, M. and G. Kaufman. *Design on Fabrics*
Lanterburg, L. *Fabric Printing*
Schwalbach M. and J. Schwalbach. *Screen Process Printing for the Seriagrapher and Textile Designer*

PERIODICALS

American Fabrics
Clothes Magazine
House and Garden

INSTRUCTIONAL SUPPLIES

- Large swatches of printed decorative fabrics
- Samples of resist-method primitive ethnic fabrics
- Samples of printed cardboard or paper posters, decorative panels, brochures, etc.
- Samples of tie-dyed fabrics
- Samples of commercial discharge fabrics
- Hinged boards with small screens for posters, panels, etc.

ADVANCED WOVEN DESIGN

Prerequisites: *Woven Design I*

Suggested Hours: 60

Behavioral Objectives

This area of instruction should enable students to:

1. Understand the "Designer's Blanket".
2. Comprehend the basic types of Drawing-In Drafts and the fabrics they produce.
3. Experiment with the patterning capacity of 8 harnesses, on graph paper, as well as on the loom.
4. Dress a hand loom (by the front to back method) and tie-up the lams and treadles.
5. Know what constitutes a "color line" and the sources of information of color trends.
6. Do a pick-out and basic analysis of a woven fabric.
7. Know what "Color and Weave Effects" are and how to draft them.
8. Alter an existing warp by adding "tie-ins".
9. Keep more complex weaving records.
10. Understand how to prepare samples for presentation.
11. Produce a portfolio of their work.

Instructional Guidelines

Multiple harness foot powered looms with a minimum of 8 harnesses are used in the development studios of most mills as a flexible and inexpensive way to test-produce, correct or modify fabric "ideas." As a necessary step in the development of a cloth, customer orders may be placed and accepted with confidence on samples correctly woven by hand.

The central learning experience of this area of instruction is planned around one project in 4 parts. The project could be used as it is given, with other related projects, or assigned as two, three or four shorter co-ordinated warps. Once information is given the students, the more time they are allowed and the more work they can achieve, the more competent they will become.

While it is essential that students be able to read and understand a specification and meet its requirement, it should only be enforced rigidly when a learning point is to be made. Also, students should take responsibility for making decisions as rapidly as they are able, as part of the learning experience. (For instance: if the draws and weaves are specified, students should figure out the chains – or if the chains and draws are given, students should figure out the weaves). Once they have sufficient information and are encouraged to find the answers to their own questions, they should be able to originate much of their own material.

A minimum of demonstration is needed at this point in study, but many lectures and homework assignments should be given covering specific information with which a textile weaving designer must be familiar.

The final phase of this area of instruction should be the preparation of a portfolio consisting of a carefully arranged and selected presentation of the samples woven during the learning experiences. This portfolio is presented by the students at future job interviews as evidence of their experience, originality and taste, and general understanding and proficiency.

Teaching Modules

I. Introduction to Drafting
II. The Basic Drawing-In Drafts: The Color Line
III. Dressing the Loom (Front to Back): The Tie-Up
IV. Doing a Pick-Out and Drawing-In Draft
V. Weaving on the Floor Loom
VI. Color and Weave Effects: Changing an Existing Warp: Tie-In's
VII. Finishing Samples: The Portfolio

I. INTRODUCTION TO DRAFTING

Teaching Content

A. Handling Looms and Yarns
   1. Caring for looms and work areas
   2. Handling yarns

3. Using accessory equipment

B. Procedure to Follow in Drafting
   1. Determining the area of repeat
      a. For a drawing-in draft
      b. For a weave draft
   2. Marking off on graph paper
   3. Drafting the 1st end
   4. Drafting the 2nd end, etc.

Learning Experiences

1. To reorient students, have them do the following exercises:
   a. Draft an even-point draw on 4 harnesses that repeats on 30 ends.
   b. Draft a straight draw on 12 harnesses.
   c. Draft a herringbone on 4 harnesses — 16 ends right, 16 ends left, with clear breaks.
   d. Identify the fewest harnesses needed to produce:
      1) Plain weave
      2) Twill weave
      3) A 4/1 satin weave
2. Distribute and discuss the following project for this area of instruction: A designer's blanket made with yarns appropriate to type of fabric selected for study by student (women's wear, men's wear, etc.). The warp in five 4" sections (each section a different but related color, each section in different draw) will be woven in four parts, with 25 samples for each part.
   Part #1. Simple weaves (a different weave for each warp); the blanket woven on itself
   Part #2. Simple weaves, textured fillings
   Part #3. Complex weaves
   Part #4. 2 and 3-color tie-in's: checks and plaids
3. Give students the following assignment for the next class meeting: "There are 18 different orders of 45 degree twill interlacings on a 7 harness straight draw. Draft these weaves and write their symbols."
4. Assign each student a loom and show where heddles, cranks and shuttles are kept. Have students review notes from *Woven Design I* and familiarize themselves with equipment and determine type of shed.
5. Show students the yarns with which they will be working; finer, more fragile, and more elastic than cotton, it will be clear upon examination that the samples they are to make will have quality.

II. THE BASIC DRAWING-IN DRAFTS: THE COLOR LINE

Teaching Content

A. The Drawing-In Draft
   1. Definition
   2. Different ways of writing
   3. Other names

B. Basic Types of Drawing-in Drafts
   1. Straight
   2. Point
   3. Broken
   4. Intermittent or Offset
   5. Grouped
   6. Scattered or Satin
   7. Spiral
   8. Divided
   9. Combination

C. Guidelines for Planning Drawing-In Drafts
   1. Logic and clarity
   2. Minimum number of harnesses
   3. Even distribution of ends
   4. Exceptions

D. The "Color Line"
   1. What does it constitute
   2. How is it determined

E. Sources of Information about Color Trends
   1. Fashion magazines
   2. Retail stores
   3. Mass culture and life styles
   4. Current events
   5. Customer purchases and requests

Learning Experiences

1. Have students start to plan for their blankets by:
   a. Selecting warp colors
   b. Determining the sett of the yarn
   c. Checking the dents/inch in reeds
   d. Deciding the sleying sequence
   e. Completing all calculations
   f. Researching and/or originating warp plans
   g. Preparing drafts of the 5 warp plans to use during drawing-in
   h. Determining number of heddles needed on each harness
   i. Preparing the loom for dressing
2. When all material has been approved by the instructor, students will proceed to make their warps.

III. DRESSING THE LOOM (FRONT TO BACK): THE TIE-UP

Teaching Content

A. Advantages of Dressing the Loom
   1. Back to front
   2. Front to back

B. The Function of the Lams
   1. On a multi-harness loom
   2. During the weaving process
   3. In production weaving

C. The Tie-up
   1. Relation to the chain
   2. How accomplished
      a. On a counterbalanced loom
      b. On a jack loom

Learning Experiences

1. Demonstrate dressing the loom front to back:
   a. Warp and lease sticks secured on breast beam
   b. Loop cut at top of warp
   c. Warp centered and sleyed in reed
   d. Cross and lease sticks transferred behind reed
   e. Ends entered in heddles and tied onto apron of warp beam
   f. Warp rolled onto beam under smooth tension
   g. Ends trimmed and tied onto front apron
2. Have students finish warping and proceed to dress looms as fast and as efficiently as possible. They will be able to do the sleying and entering alone, but beaming the warp is carried out most rapidly when there are two persons working: one in front, unchaining, "combing" the warp with the beater, snapping yarns apart and moving uneveness towards the bottom of the warp while holding tension even; the assistant in back, turning the crank and placing heavy paper or sticks between the layers of warp.
3. Assign students to bring pick glasses to next class.

IV. DOING A PICK-OUT AND DRAWING-IN DRAFT

Teaching Content

A. The Pick-Out
   1. Explanation
   2. Usefulness

B. General Analysis of Fabric
   1. Identification of the face
   2. Identification of the warp
   3. Counting of ends per inch
   4. Writing out warp arrangement
   5. Testing of yarns for ply, fiber, count
   6. Analysis of filling as above

Learning Experiences

1. Demonstrate pick-out and drawing in draft as follows:
   a. Trim swatch (prepare for taking apart).
   b. Loosen first end and study under pick glass.
   c. When pattern of weaving is clear, draft end and remove.
   d. Continue observing, recording, discarding ends until the drafted weave repeats itself and the pick-out is now complete. (Select adequate space on graph paper directly below pick-out on which to plot the drawing-in draft).
   e. Starting on one side, draft the first end of pick-out on 1st harness.
   f. Scan the weave and place all ends weaving as first end on the 1st harness.
   g. Place next available end on next available harness (in this case, #2); draw down all like ends on same harness.
   h. Continue as above until all ends are drafted.
2. Have students spend enough time to be certain they understand how to do the pick-out and assign a completed analysis and weave and drawing-in draft with mounted sample for next class. This first experience should be followed by two or three others to enable students to have practice in the technique.

V. WEAVING ON THE FLOOR LOOM

Teaching Content

A. Good Weaving Techniques
   1. Making bobbins and "dressing" shuttles correctly
   2. Grasping center of beater
   3. Using both hands and feet
   4. Developing rhythmic movements

B. Factors in Estimating and Achieving Correct Pickage
   1. Relaxing of yarns when warp is off tension
   2. Shrinkage factor of type of yarn
   3. Heavier or lighter beat depending upon weave

Learning Experiences

1. When looms have been tied-up, heading woven, and work checked for errors in threading, sleying, or tension, have students start weaving first part of the project. Keep filling specifications simple and have students concentrate on learning to adapt 4-harness weaves to 8-harnesses, learning to tie-up the weaves, learning good weaving technique, and getting an evenly beat-up fabric.
2. In weaving the second part of the project, encourage students to think of different ways to achieve a textured look besides the obvious one of using nubby, hairy, or loopy yarns as solid fillings.

For example:

a. Plying yarns of contrasting color
b. Using 4 or 5 different colors equal in value, in a pick and pick arrangement
c. Using plain and fancy yarns in striped or pick and pick (Urge students to bring in fillings they would like to try out)

3. In weaving part #3 of the project, students will be experimenting with the capacity of the 8-harnesses to produce intricate and/or bold patterns (one a fancy twill). This will involve research and "out of class" study as well as class time in which to test ideas out on the loom. Discuss drafts with the students before they weave.

VI. COLOR AND WEAVE EFFECTS: CHANGING AN EXISTING WARP: TIE-IN'S

Teaching Content

A. Color and Weave Effects
   1. Description of how achieved
   2. Importance to commercial designing
   3. Procedure for drafting
      a. Placement of motif in corner of graph paper
      b. Indication of warp arrangement across top
      c. Indication of filling arrangement down side
      d. Drafting of interlacings where dark warp is raised
      e. Drafting of interlacings where dark filling is surface of weave
      f. Continuation until completion of all weaves

B. Tie-In's

Learning Experiences

1. Have students spend time studying color and weave drafting and work out a few weaves so they understand how it is done. Assign a plate for the next class (3 to 5 of these plates should be planned by the instructor).
2. Demonstrate tie-in's as follows:
   a. Secure lease sticks holding new ends to breast beam.
   b. Cut ends to be replaced.
   c. Tie new ends onto old.
   d. Ease knots through reed, heddles and secure in back.
   e. Secure tension on new ends in front.
3. Have students incorporate a series of stripes, tie-in's using 2 or 3 colors per section into the existing warp in Part #4 of the project. Careful planning will be necessary to achieve variety and to keep the tie-in's as simple yet as effective as possible (replacing a minimum of ends). Have students proceed to do the tie-in's by:
   a. Designing the new warp arrangements
   b. Deciding on exact number of ends of each color and their cut length
   c. Warping the ends
   d. Placing them in the warp

VII. FINISHING SAMPLES: THE PORTFOLIO

Teaching Content

A. Procedure for Finishing Blankets
   1. Stitching ends
      a. Mending
      b. Trimming
   2. Washing
      a. Wetting out in lukewarm water
      b. Soaking clean in 2 baths (pure soap)
      c. Gentle rinsing in 2 baths
      d. Using fabric softener in 3rd rinse
      e. Patting out moisture in towelling
      f. Drying away from heat, in towelling
      g. Steam pressing
   3. Rolling tighly (face in) around a paper tube

B. Presentation of Samples
   1. By designers
   2. By students
      a. Presentation portfolio
      b. Bristol boards and envelope

Learning Experiences

1. Have students wash and press their blankets and bring into class for evaluation
2. After a "critique" by the teacher, have students prepare their work for presentation as follows:
   a. With blanket face down on table, strip top, bottom and both sides of individual samples with masking tape.
   b. Turn blanket face up and cut samples apart parallel to warp and filling, using pinking scissors if possible.
   c. Sort swatches, and place in groups which have a basic color-look in common.
   d. Arrange on pages or boards. Work for an attractive, fresh look and get as much impact as possible by adding a couple of swatches in strong contrast to the group.
   e. When finally arranged, lightly rubber-cement in place.

Note: The job of arranging these "pages" is more complicated, requires more time and study than would appear. A minimum of three class sessions can easily be devoted to this task. It is a pleasant end of semester activity with everybody working together under the guidance and encouragement of the instructor.

Suggested Evaluation

Evaluation of samples woven by the student to be based on:

1. "Hand" and evenness of beat
2. Absence of weaving errors
3. Appropriateness of fabric for the intended end use specified by the student
4. Richness and harmoniousness of color and texture
5. Accuracy of the documentary records
6. Neatness of the records

Teaching Resources

TEXTS AND REFERENCES

Kirby, M. *Designing on the Loom: How to Do It Series #57*

Oelsner, G. H. *Handbook of Weaves*

Watson, W. *Textile Design and Color*

PERIODICALS

American Fabrics

Fashion Magazines

Women's Wear Daily

INSTRUCTIONAL MATERIALS

- Foot powered looms with a minimum of 8 harnesses
- Yarns
- Auxilliary small tools
- Warping boards
- Bobbin winders and yarn holders
- Pick glasses
- 8" x 10" square graph paper
- Scissors
- Tapemeasure

ADVANCED WEFT KNIT DESIGN

Prerequisites: *Weft Knit Design and Technology*

Suggested Hours: 60

Behavioral Objectives

This area of instruction should enable students to:

1. Understand and recognize the fabric construction made on two-needle bed machines.
2. Be able to judge the yarn sizes suitable for different gauges of double knit versus single knit machines.
3. Recognize and be able to plan the application and aesthetics of color in double knit fabrics as opposed to single knit construction.
4. Know the technology, aesthetics, and procedures for designing rib fabrics.
5. Know the technology and procedures for distinguishing between different types of double knits.
6. Understand the design possibilities and limitations governing jacquard mechanisms using double knit machines, as opposed to single knit designing.
7. Understand the concept of electronic knitting machines and know the procedures used in designing for them.

Instructional Guidelines

This area of instruction, which builds on the students' knowledge of knit design and technology acquired in the prerequisite instructional area, develops their ability to design for double knits and more advanced knit mechanisms. It aims to provide students with information and design experiences relating to double knit equipment, from simple knitting machines to sophisticated electronic ones.

Since both the design element in knits and technical efficiency are equally as important, it is suggested that the instructor modify or continue learning experience projects according to the particular capabilities and interests of individual students.

It is further suggested that instruction should be implemented by frequent mill visits and exposure to actual knitting processes, since the cost of complete double knit laboratory equipment makes it impractical and quite prohibitive for a textile design program.

Teaching Modules

I. Double Knit Machines and Construction
II. Color in Double Knit Fabrics
III. Rib Fabrics
IV. Double Knit Fabrics
V. Jacquard Mechanisms
VI. Electronic Knitting Machines

I. DOUBLE KNIT MACHINES AND CONSTRUCTION

Teaching Content

A. Components of Double Knit Machines
   1. Cylinder
   2. Dial
   3. Yarn supply for both needle beds
   4. Camming: K–W–T (knit-welt-tuck)
   5. Take-up mechanism
   6. Timing: synchronized, delayed

B. Varieties of Needle Selection
   1. Single purpose one-type needle
   2. Two-needle selection
   3. More than two-needle selection
   4. Jacquard mechanisms
   5. Selection on dial, two-needle, four-needle

C. Single Purpose Double Knit Machine
   1. Single purpose knit camming
   2. Single purpose interlock camming

D. Multi-Purpose Double Knit Machines
   1. Multi-track, multi-needle
   2. Equipped with individual needle selection mechanism

Learning Experiences:

1. Using an actual cam section from a cylinder and dial of a double knit machine, demonstrate needle

path and action. Distribute mimeographed diagrams of same.
2. Taking the carriage of the demonstration flat bed hand knitting machine, show needle-cam interaction during different stitch formations.
3. Have students draw a loop diagram of double knit construction, demonstrating all needles knitting.
4. Distribute double knit swatches. Have students compare face and back appearance, noting difference between single knit, and double knit face and back. Then have students unravel swatches and note difference between single knit and double knit fabrics.
5. Demonstrate the absence of the curling factor in double knit fabrics as opposed to single knits.
6. Demonstrate yield and yarn size differences in the respective cloths and discuss the reasons for these differences.

II. COLOR IN DOUBLE KNIT FABRICS

Teaching Content

A. Practical Limitations of Numbers of Colors in Double Knits
   1. Production increase through judicious limitation of color
   2. Color distortion in double knits
   3. Ameliorating or planning for color distortion
   4. Limitations of floats on single versus double knits as relating to clarity of design in construction
   5. How to achieve clearer color
   6. Coordinating solid knits with jacquard patterns

B. Striping with Color on Double Knit Machines
   1. Color limitations on double knit stripers
   2. Achieving maximum color effect with minimal number of colored yarns

C. Achieving Maximum Color Effects in Double Knit Jacquard, Maintaining Minimal Weight and Hand

Learning Experiences

1. Have students visit a knitting mill to observe actual machine and work operations. If possible, arrange for a lecture-discussion by a knitting technologist on the operations viewed.
2. Have students draw a loop diagram demonstrating how color not needed on the face of the fabric is taken up by dial needles.
3. Distribute swatches demonstrating degree of color distortion created by using different dial construction and then have students plan and graph 5 or 6 small color patterns, using two-feed face courses.
4. Demonstrate how the number of feeds available on the machine control the number of colors in the height of repeat.
5. Demonstrate how to impart "grin through" into solid cloth planned to coordinate with part of a jacquard fabric, and then have students plan 2 or 3 different coordinated designs for it.

III RIB FABRICS

Teaching Content

A. Types of Rib Fabrics
   1. Regular
   2. Irregular

B. Rib Fabrics Using Two or Three Different Stitches
   1. Half-cardigan, full-cardigan
   2. Ribs constructed for required elasticity
   3. Increasing or decreasing yield (width and weight) by using different stitch construction
   4. Racked ribs

C. Representation
   1. Needle bed representation
   2. Gaiting of needle beds
   3. Graphing of various ribs

D. Individual Fabric-Lengths with Finished Edges through Transfer Starts

Learning Experiences

1. Distribute samples of different types of ribbed fabrics for students to analyze and identify.
2. Have students design and knit simple ribbed fabrics on the hand knitting machine.
3. Have students knit half and full cardigan ribs on the hand knitting machine and then discuss the differences between their respective width and weight.
4. Using the hand knitting machine, demonstrate how to achieve separated pieces through different constructions.
5. Have students design a sweater for their own use out of available yarns in 3 colors:
   a. with plain rib construction
   b. with fancy stitches
6. Have students knit a garment of their own design as a term project. It is suggested that this be done on a rotating basis, with two students working as a team.

IV. DOUBLE KNIT FABRICS

Teaching Content

A. Importance and Representation of Dial Stitches (Back of Cloth)

1. Distortion due to improper dial knitting
2. Interlock dial
3. Pique dial
4. Graphing dial stitches in solid colored fabric
5. Graphing dial stitches, in 2, 3, and 4 colored patterns

B. Standard Double Knit Construction
1. Interlock
2. Pique (Swiss and French)
3. Ponte de Roma
4. Milano Rib
5. Ottoman
6. La Coste
7. Blister cloth

C. Aesthetics and Graphing
1. Representation of stitches on proper sized graph paper
2. Relationship of graph to size of design of actual knitted fabric and how to calculate it
3. Allowing for knitted motif distortion in design-for double knit fabrics

Learning Experiences

1. Have students visit a knitting mill to observe technicians at work graphing patterns for production.
2. Distribute samples of double knit construction to students to analyze, identify, and distinguish between the different constructions.
3. Have students draw loop diagrams of double knit fabrics.
4. Have students design vertical 2-color stripes on graph paper for interlock fabrics.
5. Have students design horizontal stripes on graph paper for interlock fabrics.
6. Have students design checkerboards for interlock fabrics.
7. Have students draw the backs of the above three fabrics with interlock versus pique camming.
8. Have students design feed stripes for Swiss Pique and Ponte de Roma constructions, using (a) 36-feed machine, and (b) 72-feed machine.
9. Demonstrate wale and course ratio in fabric versus graph paper ratio.
10. Have students draw a checkerboard design on graph paper, compensating for distortion.

V. JACQUARD MECHANISMS

Teaching Content

A. Various Means of Achieving Individual Needle Selection on Double Knit Machines
1. Raceway
2. Mini-jack
3. Wheel
4. Drum
5. Discs
6. Wheel and tape
7. Others

B. Limitations of Repeat Areas in Width
1. Number of slots in wheel and its relation to the number of needles in cylinder
2. Number of different butt heights on clavettes in cylinder
3. Height of drum
4. Number of teeth on each disc
5. Arrangements of jacks around needle cylinder

C. Limitations of Repeat Areas in Length
1. Number of feeds on machine
2. Number of different link heights on chain
3. Number of positions on drum
4. Number of discs in stack
5. Length of film
6. Capacity of film cannister

Learning Experiences

1. Distribute samples of fabrics knitted on machines equipped with (a) wheel, (b) drum, (c) other jacquard patterning mechanism. Have students analyze, identify, and compare design capabilities and limitations of each type of jacquard machine.
2. Have students design patterns suitable for knitting on (a) wheel, and (b) drum machine for identical appearance.
3. Have students design a 3-color jacquard for drum machine, using basic repeat area, and have them elongate same to a garment-length pattern, using irregular drum racking or idling.
4. Have students visit a knitting mill and arrange to have them examine various jacquard machine operations.
5. Have students design a coordinated group of 3 colors, using 1 mini-jack, 1 wheel, and 1 disc machine in three color ways, choosing from 8 yarn-dyed colors.
6. Have students design and graph the face appearance and the expanded graph for a 4-color jacquard fabric, using one color as single blister construction.

VI. ELECTRONIC KNITTING MACHINES

Teaching Content

A. Components of a Complete Electronic Knitting Set-up
1. Pattern preparation system
2. Electronic knitting machine

B. Pattern Preparation Systems for Electronic Knitting
   1. Optical scanning
   2. Digitizing
   3. Others

C. Limitations of Pattern Areas
   1. Small repeats
   2. Number of needles in machine

D. Comparison of Some Electronic Knitting Equipment
   1. Morotronic
   2. Electraknit 48
   3. Bentley
   4. Dubied
   5. Others

Learning Experiences

1. If community resources permit, have students visit a mill which uses any of the electronic knitting systems.
2. Demonstrate how to design a jacquard pattern using the Morat System. Then have students design a large jacquard pattern of 4 colors, using half the number of needles in the cylinder and translate two revolutions onto mylar film used by the Morat System.
3. Demonstrate various design modification capabilities available through computer programming, and then have students graphically simulate some on their own designs.
4. Continue projects, as time permits, until students have familiarized themselves thoroughly with all phases of design for weft knitting machines.

Suggested Evaluation

1. Evaluation may be based on an end-term portfolio of the students' own designs which demonstrate:
   a. Technical accuracy
   b. Originality of design
   c. Neatness in presentation of portfolio
   d. Ability to identify the correct machines for knitting their designs
2. Students may be evaluated on their ability to correctly graph out a given number of assigned designs.

Teaching Resources

TEXTS AND REFERENCES

Dubied Knitting Manual
Lancashire, J. B. *Jacquard Design and Knitting*
Mills, R. W. *Fully-Fashioned Garment Manufacture*
Moyer, Earl D. *Principles of Double Knitting*
Reichman, C. *Advanced Knitting Principles*
----- *Double Knit Fabric Manual*
----- *Electronics in Knitting*
----- *Handbook of Knitting Yarns and Knitwear Dyeing Processes*

PERIODICALS

American Fabrics
Daily News Record
Knitting Times
Modern Textiles

INSTRUCTIONAL SUPPLIES

- Flat bed hand knitting machine
- A cam section from a cylinder and dial of a double knit machine
- Sample swatches of different types of double knit fabrics
- Sample swatches of piece dyed, cross dyed and yarn dyed fabrics
- Samples of different types of yarn
- Samples swatches of knitted fabrics with different yarn sizes
- Sample swatches of single and double knit fabrics, fabrics produced on automatic and fixed stripe machines, rib fabrics, jacquard mechanism fabrics, coordinated knit fabrics
- Graph paper
- Magic markers
- Pick-out glasses
- Pick-out needles
- Paint
- Brushes

FACILITIES, LABORATORIES, EQUIPMENT, SUPPLIES, COSTS

FACILITIES AND LABORATORIES

The instructional facilities and laboratories for a textile design program require careful planning because of the specialized nature of different design areas and the storage facilities that each requires for specialized equipment and supplies. Class sizes must also be carefully considered and predetermined in planning laboratories since any contemplated increases involve a good deal more than the simple addition of a few chairs. The laboratories, layouts and equipment discussed in this section are based on classes ranging from 16 to 20 students.

Although each specialized laboratory room or area requires different functional equipment and arrangements, it is recommended that the following factors and facilities be included in all:

1. Maximum *wall space* for blackboards with a minimum of 4' x 16'.
2. One 4' x 4' *blackboard* with a specialized *grid* for drafting and designing of lessons.
3. Proper *lighting* for student work-stations as well as for the room in general. Fluorescent lighting is desirable. (It is suggested that a lighting specialist be consulted since the set-up in each room is likely to be different.)
4. *Plumbing and electrical services* *
   a. Hot and cold *running water*
   b. 220 volt electrical service, preferably with circuit breakers and a master control panel, or power switch key
5. Ample *display space* for finished work in the form of racks, cork boards, display cases or other display facilities. (If laboratory space is limited, display space can be located in adjacent hallways or elsewhere in the school.)
6. *Lockable* storage facilities for students and teachers. (Careful consideration should be given to the whole matter of security because of the high cost of equipment and supplies.)
7. *Instructor facilities:*
   a. Lockable desk
   b. Storage facilities for teaching resources such as illustrated books, fabrics, yarns, photos, magazine clippings, slides, specialized equipment, slide projector, etc.
   c. Storage facilities for student work to be graded (Size of storage facilities will depend upon class size, number and complexity of class assignments, and frequency of grading.)
   d. File cabinet for student projects, instructional outlines, supply lists, and miscellaneous materials

*Plumbing and electrical specialists should be consulted for proper installations after functional layouts are planned.

Print Design Laboratory

Print design laboratories are used for all textile design areas of instruction other than specialized classes in weaving and screen printing. The number and size of the laboratories will therefore depend upon the size of the largest class, and the number and scheduling of class sections.

A layout of the suggested space and functional arrangement of a print design laboratory for a class of 20 students is included in this section. Storage space is ample to accommodate its various needs. Two worktables and a light-table provide added facilities and enable students to work simultaneously at different tasks. A cork board at the rear of the room provides space for project viewing.

Storage lockers which are needed by textile design students are not included in the laboratory since students can utilize large clothing lockers for their work-in-progress portfolios.

Woven Design Laboratory

Each student in a beginning weaving class needs a 2½' x 3' flat counter top work station to accommodate a table loom and other necessary weaving equipment such as warping boards, reels and the like. Since work-in-progress remains on the loom, a separate loom and a lockable storage cabinet for each loom, measuring 12" wide, 18" deep and 14" high, are essential for each student. Thus the total number of beginning weaving students determines the total number of looms and

storage cabinets required while the size of the largest class determines the number of work stations needed.

Advanced weaving classrooms require space for one floor loom and a combination storage-seating bench for *each* student and sufficient access space to each loom from all sides.

The diagrammed layout of a weaving laboratory which is included in this section is for a weaving laboratory facility that is suitable for beginning classes and for an advanced class of 15 students. The floor space for 16 floor looms (15 students and teacher) can be eliminated if advanced classes are to be housed in a separate weaving laboratory or if advanced weaving courses are not included in the program.

Screen Print Laboratory

Unlike the print and woven design laboratories, separate work stations are not required for each student. While some are working at the print tables, others will be at the light box, light table, wash room, drying racks and so forth. Each student, however, does need individual, separate, storage space. In the screen printing laboratory layout included in this section, student storage facilities are shown behind the sliding blackboards but they can also be located in an adjoining room or hallway. Within the laboratory there must be adequate and accessible storage space in the Color Mixing, Wash, and Screen Coating areas for specialized tools and equipment used by the students. Additional storage facilities are needed for rolls of fabric and paper that require vertical storage.

Water and chemical solutions are used extensively in all areas of the laboratory. Because of inevitable spills, to say nothing of possible leaks, a waterproof membrane is necessary under the flooring to protect ceilings below, and the floor itself should be designed with these usages in mind.

1. The *Color Mixing area* requires sinks for rinsing freshly dyed fabrics, and for washing equipment. At least two electrical outlets of 220 volts are needed, plus two rheostats for current control of homogenizers. Under-counter storage space is needed for electrical hot plates (used for heating dyes, and waxes for batik, etc.), as well as for ladles, small plastic color pots, and associated equipment. In addition, plenty of shelf space is required in the Color Mixing area for dyes, pigments, metric scales for weighing dyes, dye pots and measures, etc.
2. The *Wash area* needs a hot and cold water supply, and a trough with hoses at each end for washing out screens, as well as storage space for wet screens.
3. The *Screen Coating area,* where photographic emulsions are applied, should be lighted solely by two 15 watt bulbs over the print table. Outlets for 2 electric fans are needed, together with racks beneath the table to accommodate screens while drying.

Other factors to bear in mind in laying out the laboratory for plumbing connections and electrical circuits are the following:

1. The "Iron" in the diagram is a *rotary mangle* with a 51" wide roller for curing pigment prints and reactive cotton dyes.
2. The *Fabric Rack* is to store at least 5 rolls of currently used 51" wide material of approximately 100 yards each, and one roll each of brown paper and white paper. Iron pipes are best used to hold these bolts.
3. A *sink* with hot water is needed near the stainless steel color table.
4. The *Light Boxes* are used for tracings and for retouching pinholes in screens.

Knit Design Facilities

The equipment needed for weft knitting design, which is the emphasis of the areas of instruction included in this program, may be accommodated in the print design laboratory. As pictured in the floor plan, storage "G" should be reserved for yarn storage, with pull-out shelves to ensure better functionality. Additional storage space may be found in any of the "A" sliding cabinets and drawers. A flat bed hand knitting machine, or machines, may replace the working table "H" at the rear of the room. A movable blackboard, one side graphed and one side plain, can be very useful as an instructional tool.

EQUIPMENT

The suggested quantities in the equipment list that follows are based on one class of 20 students enrolled in the comprehensive program contained in this guide. In the event that the screen printing, knitting, and/or woven design areas of instruction are excluded from the program, the equipment listed under these areas can be omitted. Prices have been researched and approximated as of the date of this publication. A list of suppliers of equipment and materials is included at the end of this section.

Print Design Equipment

Item	*Quantity*	*Approx. Cost Per Unit*
Tilt-top drafting tables – Top size 37½" x 60"	20	$ 149.50
Park tabouret	20	57.00
Stool with shaped backrest	20	19.50
Tracing table – 24" x 36"	1	213.00
or		
Tracing box – 24" x 36"	1	132.00
36" Cutters with automatic clamp	2	134.95
Metal-edged boards – 16" x 21"	20	7.75
Paasche air brush – size 3	1	45.00
Air compressor	1	86.95
Koh-liner (section liner) 19" ruler	20	28.80
Teacher demonstration equipment		
T-Squares – wood, laminated, transparent, edge 24"	4	5.60
Right angle triangle 18", 30/60°	2	6.00
Triangle 45/90°, 18"	2	7.50
Double boiler	1-3	20.00
Hot plate – electric burner	1-3	20.00

Screen Print Equipment

Item	*Quantity*	*Approx. Cost Per Unit*
Print tables, 30" high (three with print surfaces 25' x 51" and one with a print surface 30' x 61") of steel or wood supporting construction with shelf space for screen storage below (24" sq. x 1½" thick). Tops to be padded and canvas-covered, and with print rails 2" high along both lateral sides.	4	$ 325.00[1]
Adjustable stool with shaped backrest	20	19.50
Metal printing jigs for the 61" width print table	4	160.00
Wooden T-square	4	5.00
Metal printing jigs for two 51" width print tables	10	135.00
48" rail spacer rules with adjustable stops	3	10.00
Cylindrical rail stops	150	.75
Screen frames, Western cedar, 1½" thick stock, 24" x 24" x 2½" deep	100	4.00
Screen frames, cedar 1½" thick 44" x 30"	30	8.00
Electric homogenizers, 230 volts, ½ h.p. type CSC Serial #14822-457230	2	100.00
1-gal. stainless steel mixing pots, straight-sided	6	10.00
1-qt. stainless steel pots, straight-sided	10	2.50
Worktable, wood construction, for covering screens, with hand-tool drawers, 4' wide x 8' long by 32" high	1	200.00
Drying rack for screens, equipped with fans, 42" wide x 30" high x 8' long	1	150.00
Fabric roll (51" x 2' x 8' high) rack	1	75.00
Formica-topped steel tables 7' x 4' x 32"	3	150.00

[1] Print tables may be constructed by local carpenters at an appreciably lower cost.

Screen Print Equipment continued

Item	*Quantity*	*Approx. Cost Per Unit*
Electric irons	2	10.00
Electric hot plates	3	10.00
Boards, ½" plywood (for light table)		
20" x 20"	2	1.50
10" x 9"	2	.50
26" x 38"	1	3.00
10 lb. weights (for light table)	10	2.00
Foam rubber mats ⅜" thick		
20" x 20"	2	2.50
9" x 10"	3	1.00
26" x 38"	1	5.00
Paper cutter	1	135.00
Basic hand tools		
Claw hammers	3	1.50
Screw drivers (⅛" w. tip)	3	1.00
Pliers	6 prs.	2.00
Mat knives	6	.75
Scissors (6" blades)	6 prs.	1.50
Gimlets	2	.25
Steam box, wood, 3' x 3' x 6' high, felt-lined, with hooks for fabric and electric steam	1	100.00
Electric hot plates	2	10.00

Woven Design Equipment

Item	*Quantity*	*Approx. Cost Per Unit*
Adjustable stool with shaped backrest	20	$ 19.50
Stucto Art Craft 4-harness table looms[2]	21	50.00
or		
Stucto Art Craft 8-harness table looms[2]	21	70.00
Warping boards (12 yd. capacity)	10	14.00
Warping reels (Table Model, 2 yds./Turn)	2	32.00
Spool racks (20 spool capacity)	2	18.00
Cone holders (6 cone capacity)	2	12.00
Skein winder	1	14.00
Paper cutter (36" with automatic clamp)	1	135.00
Basic hand tools		
Tin snips	1 pr.	2.00
Pliers	1 pr.	2.00
Screwdriver	1	2.00
Hand stapler	1	2.00
Scissors (6" blades)	2 pr.	1.50
8-harness floor looms		
24" Macombers	8	280.00
24" Gilmores	7	325.00

[2]The following loom accessories are supplied with newly purchased table looms: drawing-in hook, lease sticks, flat shuttles, heddles and reed. Specify wooden warp frames when ordering looms since they are more effective than the metal ones. The additional loom is for teacher demonstrations.

Woven Design Equipment continued

Item	*Quantity*	*Approx. Cost Per Unit*
Swedish bobbin winder	2	14.50
Hardwood loom benches	15	28.00
Medium boat shuttles	30	4.50
Raddles	6	12.50

Knit Design Equipment

Item	*Quantity*	*Approx. Cost Per Unit*
Dubied type NHF4 Flat Vee-bed hand knitting machine	1	$1,700.00
Circular stocking machine, 1 feed, hand operated (rib, or jersey); 8 Cut	1	200.00
Cam	1	Manufacturer donation
Oak frame portable blackboard, 48" x 72"	1	105.50
Casters for blackboard	1 set	10.25

SUPPLIES

The suggested instructional supply list that follows is based on one class of 20 students enrolled in the comprehensive program contained in this guide. Wherever possible and feasible, approximate prices, as of the time of this publication have been included. Where costs have been omitted, it is because they are either relatively negligible or it is anticipated that prices as of the date of this publication will be substantially different. Specialized supplies for the screen printing, weaving and knitting design areas of instruction are noted accordingly.

Item	*Quantity*	*Approx. Cost Per Unit*
Assorted papers – e.g. georgian, parchment, rice paper, murillo, water-color, croquille, bristol (dull finish)	Assorted sizes	Assorted prices
Prepared acetate sheets, 20" x 35"	24	$ 1.25
Graph paper		
1/4" – 1 pkge.	4	.88
1/10" – 1 pkge.	4	.88
Tracing paper rolls, 21" x 50 yds.	8	1.10
Tracing paper pads, 24" x 36"	8	3.20
Waxed Masa and assorted papers		
21" x 31"	sheets	1.50
42" x 30 yds.	2 rolls	8.80
Winsor Newton designer colors, assorted media	wide selection	.50-.75
Color Flex or Non-Crawl	8	.25
Luma dyes	Assorted colors	.75
Charcoal sticks – extra soft, thin vine	8 boxes	1.00
Unwaxed Masa paper, 21" x 31"		.40
Bristol watercolor and other papers	Assorted	Dependent on quantities
Troya paper sheets, 24" x 36"	Assorted	.13
Moriki paper, white, 25" x 36"	Assorted	.25
Higgins black waterproof India ink	2 pints	6.20
Pen holders	6	.25

Supplies continued

Item	*Quantity*	*Approx. Cost Per Unit*
Assorted pen points	Wide assortment	$ .10
Tjanting pens – fine, medium and large	1 ea. size	5.00
Krylon Workable Fixatif – 16 oz.	4	1.95
Paraffin	12 boxes	.60
Beeswax (refined white)	12 lbs.	4.00
Teacher's demonstration supplies		
30-hole plastic palette	1	.20
Red sable Winsor Newton brushes, assorted sizes in series 197		
#3	12	3.25
#4	12	4.00
#6	12	6.50
Bamboo brushes, size #1 and #6	3 ea.	.40-.95
Ground brushes, multi-medium brush series #3647, 2" width	8	6.25
Chinese ink, crayons, cray-pas	Assorted	Assorted
T-squares, wood, laminated, transparent, edge 24"	4	5.60
Fan shaped blenders, technique brushes #6	2	1.00

Screen Print Supplies

Item	*Quantity*	*Approx. Cost Per Unit*
Polygum	20 lbs.	$ –
Assorted reactive dyes (Procion)	20 lbs.	–
Benzine	3 qts.	1.00
Bicarbonate of soda	1 lb.	1.00
Common salt (NaCl)	1 lb.	.25
Red lacquer	2 gal.	3.50
Lacquer thinner	2 gal.	2.50
Nufilm (10 yds. x 40" w)	1 roll	14.00
Kraft wrapping paper (36" wide, 50 lb. roll)	5 rolls	12.00
Rolls of cloth adhesive tape 60' x 30"	32	5.00
Photographic emulsion	16 gals.	8.50
Boxes (1000 ea.) ¼" leg staples for hand staplers	24	4.00
Sensitizer (ammonium bichromate crystals)	2 lbs.	1.80
#10 Dacron, 62" wide	100 yds.	2.75
Flat 4" angle irons	150	.10
⅜" flat-head screws	400	3.50 total
Print concentrate #1717R-3	10 gals.	3.25
Binder #1693	10 gals.	5.00
Polywhite #1586	10 gals.	8.00
Pigment colors (primaries, brown, green, black, orange)	100 gals.	6.00
Cotton fabric for printing – 38" w. 100 yds. each: white, pale pink, med. yellow, lt. blue	400 yds.	.32/yd.
Acid dyes, dry crystal	Assorted	100.00
Glycerine	1 pt.	1.50
Acetic acid	2 qts.	1.00
Tartaric acid	4 oz.	1.00
Cellusor	1 gal.	3.00
Printing inks (for paper prints)	Assorted	10.00

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Screen Print Supplies continued

Item	*Quantity*	*Approx. Cost Per Unit*
Fabrics in short lengths for printing – e.g. plain silks, acetates, wools, synthetics	Assorted	Assorted
Teacher demonstration supplies		
One yard swatches of printed fabrics in different fibers	Assorted	Assorted
One yard swatches of Indonesian, Japanese and African batiks	Assorted	Assorted
Starch resist Indigo cotton	Assorted	Assorted
Color charts for various dyes	Assorted	Available from dye manufacturers
Magnets		.30
Scotch tape, ½" width	1 doz.	.50
Masking tape, 1½" x 50"	5 rolls	2.50

Woven Design Supplies

Item	*Quantity*	*Approx. Cost Per Unit*
3/2 Black Perle cotton	15 lbs.	$ 3.50
3/2 White Perle cotton	15 lbs.	3.50
5/2 Mercerized cotton in range of 40-50 colors	2 lbs. each student	3.75
4-ply Knitting worsted in range of 40-50 colors	1 lb. each student	3.50
Kraft paper, 36" roll	50 lbs.	12.00
Boxes (1000 ea.) ¼" leg staples for hand stapler	2	4.00
20/2 Worsted yarn in range of 50-60 colors	1 lb. each student	4.50
Teacher demonstration supplies		
Masking tape, 1½" x 50"	8 rolls	2.50
Scotch tape, ½" and 1"	6 rolls	.50
Cotton twine	12 cones various sizes	1.60
Magnets	–	.30
⅛ graph paper	6 pkgs.	–

Knit Design Supplies

Item	*Quantity*	*Approx. Cost Per Unit*
600 denier filament (polyester) yarn	35 lbs.	$ 2.38/lb.
10/1 cotton count spun (acrylic) yarn	35 lbs.	1.45/lb.
1/15 worsted count wool yarn	35 lbs.	1.70/lb.
Large wooden demonstration needles	1	Manufacturer donated
Graph paper: 8 sq. per inch	6 pkgs.	–
Pick glasses	20	4.00
Pick needles (scribers)	20	1.00

Suppliers

The following is a list of representative suppliers of equipment and instructional supplies. Suppliers of specialized, knit, weaving, and screen print equipment and supplies are noted accordingly.

Arthur Brown and Bros., Inc., 2 West 46th Street, New York, N.Y. 10036
Camco Art Materials, 165 Lexington Ave., New York, N.Y. 10010
David Davis, 539 La Guardia Place, New York, N.Y. 10012
Eastern Artists and Drafting Materials, Inc., 251 Park Ave. South, New York, N.Y. 10010
Sam Flax, Inc., 25 East 28th Street, New York, N.Y. 10016

Screen print equipment and supplies are available from the following representative suppliers:

*Ciba Chemical and Dye Co., State Highway No. 208, Fairlawn, N. J. 07410
*Geigy Chemical Company, P. O. Box 430, Yonkers, N.Y. 10702
Inmont Corporation, 150 Wagarow Rd., Hawthorne, N. J. 07410
Lamb Electric Division of Amertek, 233 Broadway, New York, N.Y. 10011
Polymer Industries, Springdale, Conn. 06907
Standard Screen Supply Co., 15 West 20th Street, New York, N.Y. 10011

Weaving equipment and supplies are available from the following representative suppliers:

J. L. Hammett Co., Kendall Square, Cambridge, Mass. 02142
Lilly Mills, Department H.W.H., Shelby, N. C. 28150
Nilus Le Clerc, Inc., L'Isletville, Quebec, Canada
School Products, Inc., 312 East 23rd Street, New York, N.Y. 10010

Knitting equipment and supplies are available from the following representative suppliers:

Burlington Yarn Co., 1345 Ave. of the Americas, New York, N.Y. 10019
Dow Badische Co., Williamsburg, Va. 23185
Dubied Knitting Co., 8 Westchester Plaza, Elmsford, N.Y. 10523
Gibbs Machine Co., P.O. Box 5426, Greensboro, N.C. 27403
Knitting Machine and Supply Co., 1257 Westfield Ave., Clark, N. J. 07066
Lamb Knitting Machine Co., Chicopee Falls, Mass. 01021
Speizman Industries, 508 West 5th Street, Charlotte, N.C. 28201

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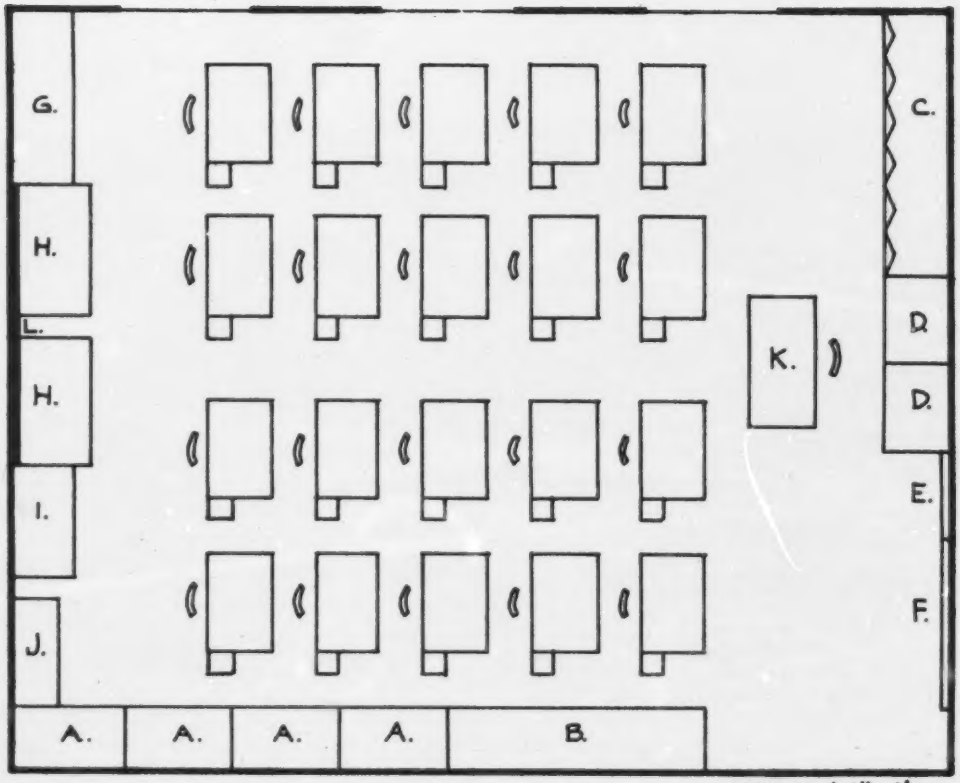
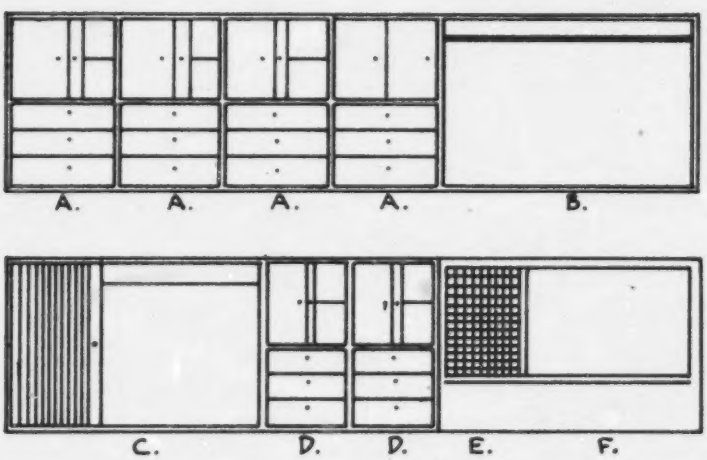
*Color charts and information on new dye products and processes are available from these dye manufacturers, among others.



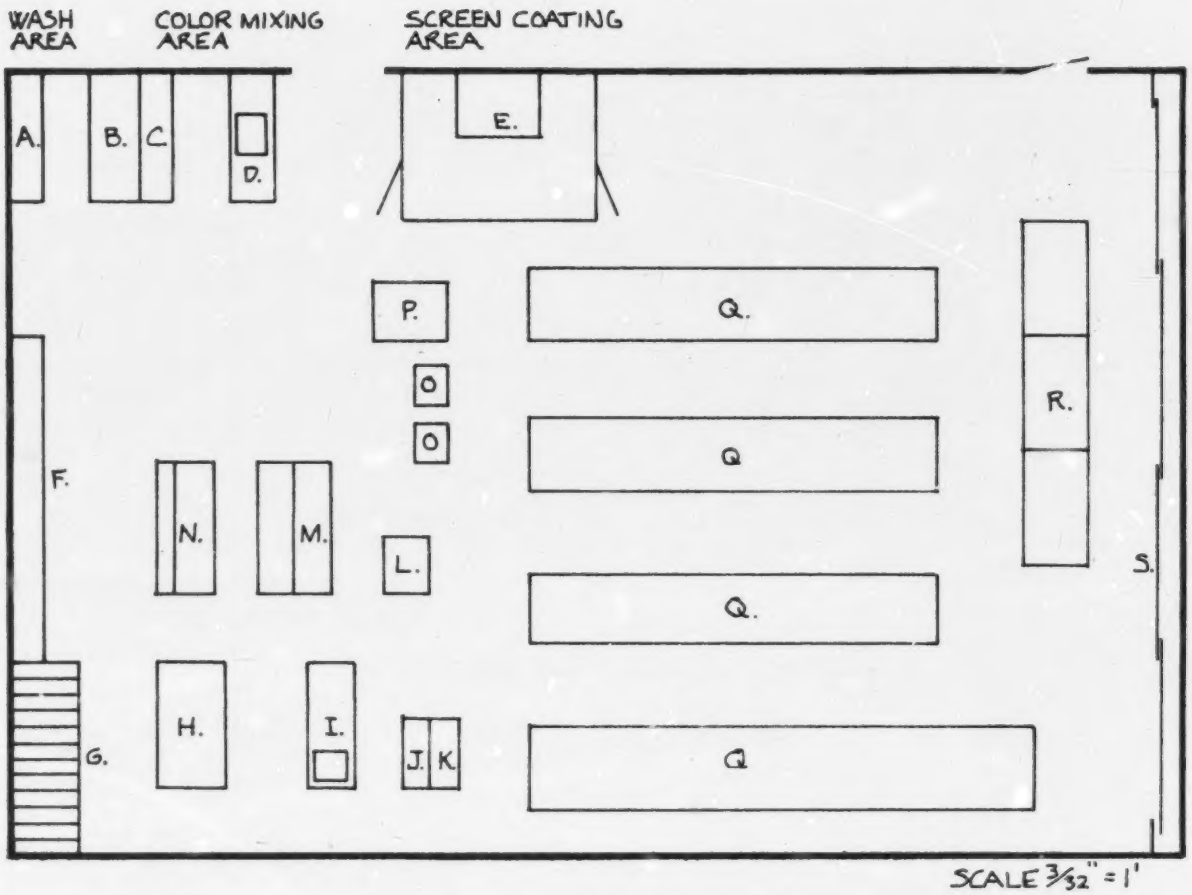
SCALE: 1/8" = 1'

Print Design Laboratory



LAYOUT LEGEND

A. SLIDING CABINETS & DRAWERS
B. OPEN CLOTHES CLOSET
C. STORAGE
D. SLIDING CABINETS & DRAWERS
E. GRID
F. BLACKBOARD
G. STORAGE
H. WORK TABLES
I. LIGHT TABLE
J. SINK
K. TEACHER'S DESK
L. CORK PANEL (ABOVE TABLES)



Screen Printing Laboratory

LAYOUT LEGEND

A. SCREENS
B. TWO HOSE TROUGH
C. COUNTER (SHELVES ABOVE)
D. COUNTER WITH SINK (SHELVES ABOVE)
E. TABLE & RACKS
F. STORAGE FOR SUPPLIES & STUDENTS WORK
G. STORAGE FOR LARGE SCREENS
H. WORK TABLE
I. COLOR TABLE WITH SINK
J. FABRIC RACK
K. IRON
L. STEAM BOX
M. STORAGE RACKS
N. SCREEN DRYING RACKS & FAN
O. LIGHT BOXES
P. LIGHT TABLE
Q. PRINT TABLES
R. FORMICA DRYING TABLES
S. SHELVES BEHIND SLIDING BLACKBOARD

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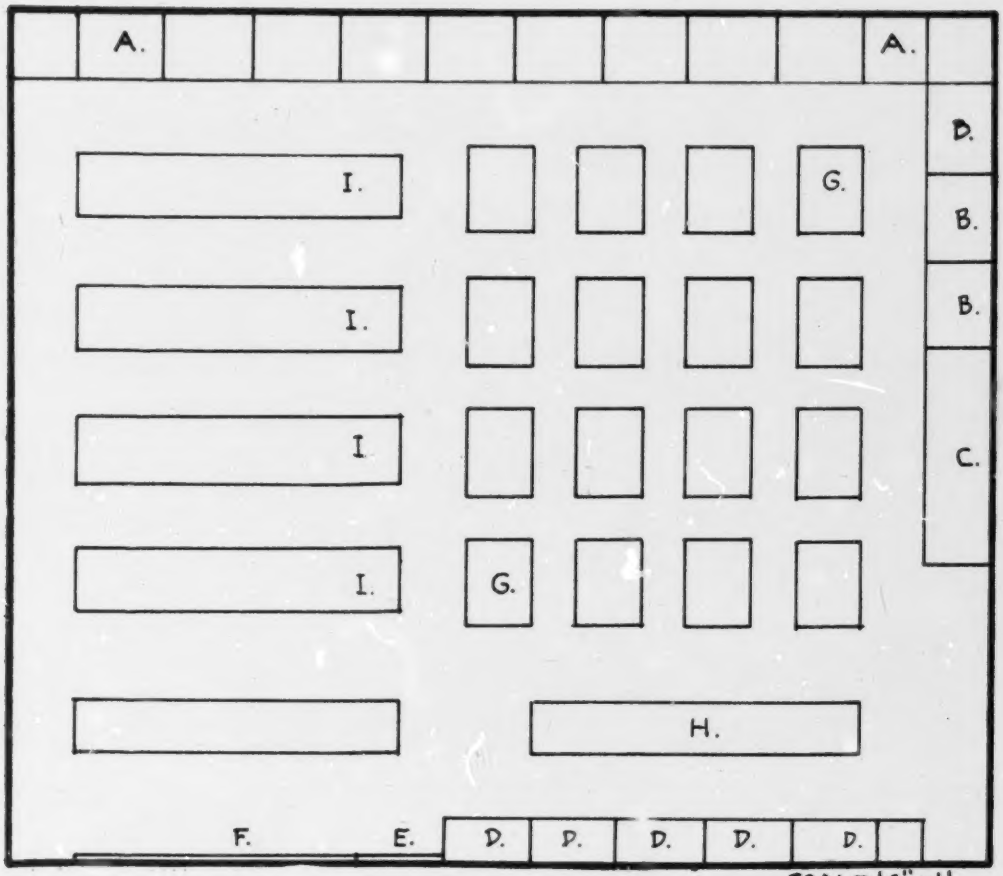

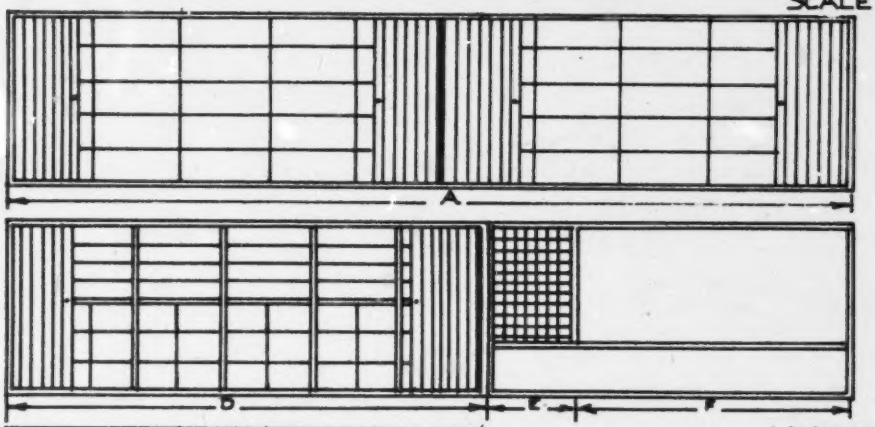

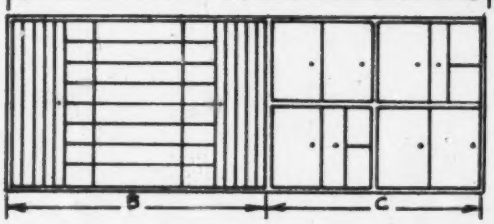

LAYOUT LEGEND

A. LOOM STORAGE CABINETS
B. SHELVES BEHIND SLIDING DOORS
C. CABINETS
D. SHELVES BEHIND SLIDING DOORS
E. GRID
F. BLACKBOARD
G. FLOOR LOOMS & BENCHES
H. WORK TABLES
I. STUDENT COUNTER TOPS

Weaving Design Laboratory

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California Men's Stylist, 1020 S. Main St., Los Angeles, Calif. 90015
Clothes Magazine, 44 West 44th St., New York, N.Y. 10003
Craft Horizons, American Craftsmen's Council, 16 East 52nd St., New York, N.Y. 10019
Daily News Record, 7 East 12th St., New York, N.Y. 10003
Design, 100 Waterway Blvd., Indianapolis, Ind. 46207
Domus, Via Monti di Pieta, 15, Milan, Italy.
Elegance, (International) S.A. Gartenstrasse 14, Postfach 8039, Zurich, Switzerland.
Elle, 100 rue Reaumur, Paris (2e), France.
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Graphis, 45 Nuschelerstrasse 8001, Zurich, Switzerland.
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Harper's Bazaar, 572 Madison Ave., New York, N.Y. 10022
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House Beautiful, 717 Fifth Ave., New York, N.Y. 10022
House & Garden, 420 Lexington Ave., New York, N.Y. 10017
Interiors, 130 East 59th St., New York, N.Y. 10022
International Textiles, 1760 Peachtree Rd., N.W., Atlanta, Ga. 30309
Knitting Times, 51 Madison Ave., New York, N.Y. 10010
L'Officiel De La Couleur, 14 Rue Duphot, Paris, France.
L'Officiel De La Couture, 226 Rue du Faubourg St. Honore, Paris, France.
Modern Textiles, 303 Fifth Ave., New York, N.Y. 10016
National Geographic Magazine, 1145 17th St. N.W., Washington, D.C. 20036
Realites, 301 Madison Ave., New York, N.Y. 10017
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Vogue, (French) 420 Lexington Ave., New York, N.Y. 10017
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